

REPORT

OF THE

WORKING GROUP

FOR THE FORMULATION OF THE

FOURTH FIVE YEAR

PLAN PROPOSALS

ON

AGRICULTURAL STATISTICS

**MINISTRY OF FOOD AND AGRICULTURE
DEPARTMENT OF AGRICULTURE
GOVERNMENT OF INDIA**

**DIRECTORATE OF ECONOMICS & STATISTICS
MINISTRY OF FOOD & AGRICULTURE**

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PREFACE

Preparatory work for the formulation of proposals for agricultural development under the Fourth Five Year Plan was taken up in the Ministry of Food & Agriculture in June, 1963 at the instance of the Planning Commission. Following the lines adopted in connection with the preparation of Third Five Year Plan, a Working Group on Agricultural Statistics was set up in the Department of Agriculture with the following terms of reference :

1. To make a critical review of the progress of the programmes and schemes in the Third Five Year Plan period;
2. To assess, in the light of current trends and other available data, the position likely to be reached at the end of the Third Plan period; and
3. To formulate proposals for the Fourth Five Year Plan in the perspective, wherever possible, of development over a 10-year period.

On the basis of the material that is available in the Department of Agriculture and the results of studies already made, the Working Group, in the present Report has attempted to make an assessment of the requirements, the potentialities for development and the organisational and technical considerations involved therein and has given broad indication of the physical programmes proposed and the financial outlays needed. The Report was transmitted to the Planning Commission in August, 1964.

The proposals and recommendations made in this Report have been taken into account in the consolidated Memorandum 'Approach to Agricultural Development in the Fourth Five Year Plan' submitted by the Ministry of Food & Agriculture to the Planning Commission.

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INTRODUCTION

In pursuance of the decision of the Planning Commission to form Working Groups on different subjects in the various Central Ministries for preparation of long-term economic development plans up to the end of the Fifth Plan, and more specially for the preparation of the projects for the Fourth Plan, the Ministry of Food & Agriculture set up, along with other Working Groups, the Working Group on Agricultural Statistics, with the membership as given in Appendix I. The Working Group was required to make a critical review of the progress of the programmes and schemes for improvement of agricultural statistics in the Third Plan period; to assess, in the light of current trends, and other available data, the position likely to be reached at the end of the Third Plan period; and finally to formulate proposals for the Fourth Plan in the perspective of a 10-year period, 1966-76. The Working Group held six meetings, the first on 21st and 22nd August, the second on 23rd September, the third on 18th and 19th December, 1963, the fourth on 12th February, the fifth on 21st February and the sixth on 25th May, 1964. In addition to the members, experts mentioned in Appendix II, were also invited to attend the meetings of the Group.

At the first meeting, the Group reviewed the progress made so far in respect of various schemes for improvement of agricultural statistics and emphasised the need for obtaining reliable and comprehensive agricultural statistics to provide a sound basis for the Fourth and subsequent Plans. With a view to fill the gaps in the existing agricultural statistics and to devise ways and means of obtaining new types of data to meet the needs of planning, the Group suggested the following heads under which the schemes of agricultural statistics under the Fourth and subsequent Plans, could be discussed :

1. Strengthening of primary reporting and supervisory agencies and extension of reporting area.
2. Adoption of standardised classification and uniform concepts and definitions and other measures to improve the quality and content of area statistics and forecast estimates.
3. Census of cultivators' holdings.
4. Index numbers relating to agricultural economy.
5. Extension of crop-cutting surveys to all principal food and non-food crops and to minor crops of commercial importance and protective foods like fruits and vegetables.
6. Statistics of improved agricultural practices.
7. Surveys for assessment of the benefits of soil conservation, land reclamation, irrigation measures, etc.
8. Estimation of crop production at block-level.
9. Diagnostic studies to reconcile the differences between the statistics collected by more than one agency.

10. Statistics of *inter-State* movement of foodgrains by motor vehicles.
11. Statistics of livestock numbers and products and animal husbandry practices.
12. Fishery Statistics.
13. Forestry Statistics.
14. Market Intelligence.
15. Derived statistics in the field of agriculture.
16. Establishment of statistical units in the State Departments of Agriculture, Animal Husbandry, Dairy, Forestry and Fishery.
17. Research investigations regarding (a) impact of milk supply schemes in rural milk collection areas, (b) fertilizer and other manuring practices, (c) incidence of and damage done by crop pests and diseases, (d) cost of cultivation of crops and livestock products, etc.
18. Cattle and Crop Insurance.
19. Strengthening of research and training facilities at I.A.R.S.
20. Setting up of a Planning Cell.

The individual members and member organisations of the Group who had built up expertise on specific items were requested to provide detailed notes on the various subjects. The desirability of maintaining proper liaison with other Working Groups was also stressed so as to avoid contradiction, duplication and overlapping. The other Working Groups were requested to indicate their requirements regarding agricultural statistics in the light of their development plans. The subjects on which papers were invited from the member organisations of this Group and from the other Groups are shown in Appendix III. Notes on almost all the subjects were received and discussed in the meetings of the Working Group.

While examining a note prepared by the Directorate of Economics & Statistics on the question of improvements in irrigation statistics obtained from land records, this Working Group emphasised the need for obtaining the cooperation of the Working Group on Irrigation, Flood Control and Soil Conservation in River Valley Projects and that Working Group was requested to prepare a similar note on the data collected from the State Irrigation Departments and other sources. That Working Group discussed at its second meeting the problem relating to reconciliation of discrepancies between the figures of additional utilisation from major, medium and minor irrigation schemes as reported by the State Governments to the Planning Commission and Union Ministries and those brought out in the publications of the Directorate of Economics & Statistics in the Ministry of Food & Agriculture. It recommended that the CW & PC and the Working Group on Minor Irrigation should send the required information relating to major and medium irrigation schemes and minor irrigation schemes respectively, to the Working Group on Agricultural Statistics so that the entire question of reconciliation between the different sets of irrigation statistics could be discussed and ways and means suggested to reduce the divergence between them. In order to facilitate careful consideration of various related problems, the representatives of

CW & PC, I & P Division of Planning Commission and Irrigation Division of the Department of Agriculture in the Ministry of Food & Agriculture were also requested to participate in the deliberations of those meetings of the Working Group on Agricultural Statistics in which the questions relating to reconciliation of discrepancies in different sets of irrigation figures and the survey for assessment of the benefits of irrigation, changes in cropping pattern due to irrigation projects, etc. were discussed. They were requested to send two notes, *viz.*, (1) Note on the data collected from the State Irrigation Departments and other sources and (2) Note on the problems of reconciliation of discrepancies between the figures of additional utilisation from major-medium and minor irrigation schemes as reported by the State Governments to the Planning Commission and Union Ministries and those brought out in the publications of the Directorate of Economics & Statistics. The Working Group on Agricultural Statistics received most of the required material from the Directorate of Economics & Statistics, Central Water and Power Commission, and the Working Group on Minor Irrigation. These and other notes pertaining to irrigation statistics and discussions thereon are summarised in Chapter VI.

On the basis of the discussions held by the Working Group, the gaps under different items of agricultural statistics as listed at the first meeting of the Working Group are reviewed and programmes for the improvement under the Fourth Plan are suggested in the Chapters that follow. The various subjects discussed are grouped under appropriate heads, and under each head a gist of the notes considered and the discussions thereon, is given. The recommendations of the Group on each subject are given in the appropriate Chapter. They are further highlighted in the Summary towards the end of the Report.

A broad idea of the objectives and tentative targets for the Fourth Plan as a whole, alongwith tentative estimates of the cost involved on the various schemes for improvement of agricultural statistics under the Fourth Plan are also indicated. The report further gives the tentative estimates of the provision tht has to be made in the Annual Plan for 1964-65 or 1965-66 in respect of those schemes for which advance action is needed during the Third Plan itself so as to prepare the necessary background for taking up the schemes in the Fourth Plan on full scale.

CHAPTER II

GENERAL REVIEW OF THE PROGRESS OF THE SCHEMES FOR IMPROVEMENT OF AGRICULTURAL STATISTICS DURING THE THIRD PLAN

AGRICULTURAL STATISTICS IN GENERAL

The defects in agricultural statistics in India and the measures to remedy them were highlighted by the Technical Committee on Coordination of Agricultural Statistics (TCCAS) set up by the Ministry of Food & Agriculture in 1949. Thereafter the problems relating to improvement of agricultural statistics in the country were discussed by the two Conferences of the State Ministers of Agriculture and Cooperation held in 1953 and 1954, and by the first Conference of Directors of Land Records, Agricultural Statisticians and Agricultural Economists, held in December, 1954. The need for a coordinated programme for the improvement of agricultural statistics and other agro-economic data was keenly felt. In particular, it was recommended that steps should be taken for strengthening of primary and supervisory agencies entrusted with the preparation of land records and collection of agricultural statistics, framing of land-use and crop estimates in non-reporting areas, extension of crop cutting surveys to commercial crops and collection of reliable statistics of protective foods. To effect the desired improvement, the Directorate of Economics & Statistics in the Ministry of Food & Agriculture sponsored during the first and second Five Year Plans schemes for adoption of basic, annual and quinquennial forms as recommended by TCCAS, extension of reporting area, estimation of production of protective foods and minor crops of commercial importance, collection of data regarding improved agricultural practices, rationalised supervision of work of area enumeration, diagnostic studies for reconciliation of tea, coffee, rubber, tobacco, forest and irrigation statistics collected by more than one agency, preparation of index numbers relating to agricultural economy and survey of culturable wastelands. Some of the States implemented a number of these schemes on State-wide basis, while others could either take them up on pilot basis or could not initiate them at all. The achievement was not uniform in all the States, as in the formulation and implementation of the schemes, they were guided primarily by their local needs, and priorities and availability of technical and financial resources.

The improvements effected in agricultural statistics in the country during the first two Plans were reviewed by the second Conference of the Directors of Land Records and Agricultural Statisticians held in September, 1960, and with a view to ensuring coordinated development on a uniform basis in all the States, the following Minimum Programme was recommended for implementation by all the States under the Third Plan.

- (i) Rationalised supervision over the work of recording of area done by the primary reporting agencies;
- (ii) Improvement in the system of recording of areas under mixed crops;

- (iii) Adoption of standard forms for collection of agricultural statistics;
- (iv) Extension of crop estimation surveys to all principal crops and strengthening of supervision over the conduct of crop estimation surveys;
- (v) Extension of reporting areas;
- (vi) Estimation of area and production of minor crops of commercial importance and protective foods like fruits and vegetables; and
- (vii) Compilation of index numbers relating to agricultural economy.

The above minimum programme has, however, not been implemented uniformly in all the States. The provision made for the schemes for improvement of agricultural statistics under the Third Plan was often reduced or diverted to other schemes, particularly after the declaration of the National Emergency. While in some States the tempo gathered during the first two Plans was kept up, much headway could not be made in others mainly due to paucity of funds. Several States did not take up the schemes for extension of 'reporting areas' and strengthening of the reporting agency, strengthening of supervision over crop-cutting surveys, adoption of standardised forms for collection of agricultural statistics, improvement in the system of recording of area under mixed crops and compilation of index numbers, relating to agricultural economy.

AGRICULTURAL RESEARCH STATISTICS

The Institute of Agricultural Research Statistics initiated during the Third Plan several research schemes to evolve suitable methodology for collection of statistics both in agriculture and animal husbandry fields. Sample surveys to obtain data on use of fertilizers and other manures by the cultivators have been planned in 19 districts. A scheme to study the incidence of major pests and diseases and consequent loss in yield of rice and wheat has been initiated. The importance of such types of studies has grown on account of the increasing use of insecticides and fungicides for stepping up agricultural production. At present, there is a great demand for improving the statistics of production of spices and other foreign exchange earning commodities such as cashewnut, cardamom, pepper, etc. To meet this demand, the Institute has already conducted sample surveys for estimating the area and production of cashewnut and important spices like pepper and cardamom. A beginning has also been made to study the methodology for collection of reliable statistics of production of vegetables and important fruit crops grown in the country.

The Institute has been conducting sample surveys during the Second and Third Plan periods to improve the statistics of important livestock products and to collect reliable information on animal husbandry practices in the country and for the first time reliable estimates of some livestock products are available for a few regions. Such surveys have been conducted for estimating annual milk production in the States of Punjab, Uttar Pradesh, Gujarat and parts of Andhra Pradesh and Orissa; for wool production in Gujarat, Rajasthan, Mysore and Himachal Pradesh; and

for egg production in Andhra Pradesh, Kerala and West Bengal. It is proposed to cover other important regions in the remaining period of the Third Plan to have fairly comprehensive estimates of production of the important livestock products, at the all-India level. On the recommendations of the Planning Commission, the Institute has initiated a pilot scheme in 12 districts to develop a suitable methodology for obtaining estimates of agricultural production at Block Level. Satisfactory completion of this project and its extension to the other districts will fill a great gap in the agricultural statistics required for preparing agricultural production programmes and for their assessment. A number of cost of production studies have also been started by the Institute and the Indian Central Commodity Committees. Scheme for estimating cost of production of cotton, oilseeds and other rotation crops in the cotton growing regions of the country was jointly implemented by the Indian Council of Agricultural Research, Indian Central Cotton Committee and Indian Central Oilseeds Committee. A suitable sampling technique for objective estimation of cost of production of milk in urban and rural areas has also been evolved by this Institute. A scheme has also been planned to study the cost of production of wool.

Till recently, research work in agriculture was very much handicapped by the absence of a unified record of experimental data in the country to serve as a reference and a guide for future experimentation. The Institute has filled up this gap by maintaining centrally the results of all agricultural field experiments conducted in the country on specifically prescribed index cards and printing them in the form of compendium periodically. So far the data of experiments carried out during 1948-53 numbering about 7,500 have been collected and the compendium in the form of 15 volumes printed by the Institute.

The agricultural research and planning in the States has suffered in the past for want of proper and timely advice from competent statisticians. In the Third Five Year Plan it was recommended that the Agriculture and Animal Husbandry Departments in the States should each have a good statistical section headed by a qualified and trained statistician. Very little progress has been made in implementing this recommendation by the States. There is an urgent need to implement this programme fully during the remaining period of the Third Plan.

The Institute of Agricultural Research Statistics has, however, expanded its training facilities to meet the need of qualified statisticians for manning statistical sections in State Departments of Agriculture & Animal Husbandry, Commodity Committees, Central Institutes, etc.

SAMPLE SURVEYS

Crop Estimation Surveys

At present about 94 thousand crop-cutting experiments are planned on principal food crops and about 29 thousand experiments on principal non-food crops. The surveys in different States are organised by the Bureau of Economics and Statistics or the Statistician in the Department of Agriculture or Land Records. The field work is generally entrusted to Revenue Inspectors/Agriculture Inspectors.

In December 1952, the work of technical coordination of crop-cutting experiments in the States was transferred from I.C.A.R. to the Directorate of National Sample Survey which is now also responsible for providing a central check of field work of these surveys in the States. Recently the N.S.S. Directorate has re-oriented the programme of supervision by introducing an intensive check on a pre-assigned random sub-sample of experiments to ensure that the crop-cutting experiments are conducted properly, and the yield data are reported correctly. An incidental but important objective of this inspection is also to obtain separate yield estimates for different crops with reasonable precision at the all-India level.

These surveys are, however, yet to cover about 16% of the area under food crops and about 20% of the area under non-food crops at the all-India level. The major gaps under the coverage of food crops occur in small millets and pulses. In the case of non-food crops the major gap is accounted for by oilseeds sown under mixture with other crops and a few pockets under sugarcane and tobacco.

Estimation of area under Improved Agricultural Practices

Based on the findings of the pilot studies carried out by the Directorate of N.S.S. in Andhra Pradesh and Uttar Pradesh in 1958-59, sample survey for the estimation of area brought under improved agricultural practices is being organised in various States since Kharif, 1961-62. So far each State has carried out the survey at least once, and in each season the number of participating States has varied from 8 to 10.

The coverage of the items under the survey is generally confined to three most important improved measures, namely, improved seeds, chemical fertilizers and chemical pesticides. The survey is carried out under the technical guidance of the State Statistical Bureaus in collaboration with the Directorate of N.S.S. The primary field work is generally assigned to Progress Assistants, though in a few cases services of Village Level Workers are also utilised.

The main impediment in the progress of this survey has been inadequate statistical staff for tabulation and analysis of the data. It was earlier felt that the tabulation work involved would be of a marginal nature and it would be possible to organise the same through the staff already available with the State Bureaus. However, the work has proved to be very heavy and the need for a special Unit in each State is being felt for the purpose of quick statistical analysis of the data.

PLAN OUTLAY AND ACTUAL UTILISATION

The Working Group on Agro-Economic Research and Statistics set up in this Ministry for formulation of proposals for the Third Five Year Plan, recommended a total outlay of Rs. 755 lakhs for improvement of agricultural statistics in the Third Plan. The main Working Group on Agricultural Production, however, reduced this provision to Rs. 400 lakhs. The States, on their own part, did not allocate even this reduced outlay to the schemes for improvement of agricultural statistics but diverted the funds to other schemes under the head 'Agricultural Development' with the result that the provision for the schemes for improvement of agricultural statistics made by the States in their Third Five Year Plans totalled

Rs. 211 lakhs only. Efforts made at the time of Annual Plan discussions to raise the provisions keeping in view the levels of development already attained, proved abortive mainly due to the ceilings imposed by the Planning Commission and the States' inability to reallocate funds for these schemes by suitable adjustment within the Plan ceilings. The schemes in several States were thus not formulated according to the desired uniform pattern and in some States they did not even meet the minimum requirement. As a result of further cut on account of the National Emergency, the minimum programme laid down by the second Conference of Directors of Land Records and Agricultural Statisticians is not being followed even in those States which had originally made provision for them. Intensified efforts are called for during the Fourth and subsequent Plans to effect the long-felt improvements in agricultural statistics in the country.

Recommendations

In order that the schemes relating to agricultural statistics do not suffer heavily under the Fourth Plan as they did under the Third Plan as a result of cuts applied to the Agricultural Development and as a result of funds being diverted from statistical schemes to other schemes under this head, this Working Group recommended that 'Agricultural Statistics' should form a separate sub-head in the programme of agricultural development.

CHAPTER III

AREA STATISTICS

STRENGTHENING OF PRIMARY REPORTING AND SUPERVISORY AGENCIES AND EXTENSION OF REPORTING AREA

Summary of the Note Received (DES-1)

At the beginning of the First Five Year Plan, the land-use and crop area statistics in India were based on complete enumeration in respect of about 47% of the geographical area and on rough conventional estimates in respect of 22%, the balance of 31% forming what is called 'non-reporting area'. As a result of the efforts made under the three Plans, the percentage area covered by complete enumeration has now increased to over 75% and another 5% area is accounted for by sample survey. The area for which only conventional *ad-hoc* estimates are available and the 'non-reporting area' have now shrunk to about 10% each. The areas for which only rough *ad-hoc* estimates based on conventional methods are framed, now lie in Orissa, Rajasthan, Gujarat, Maharashtra, Madras, Assam, Tripura, West Bengal, Andhra Pradesh and Hill districts of Uttar Pradesh. The non-reporting areas are located in Jammu & Kashmir, NEFA, Manipur and Himachal Pradesh.

The work of cadastral survey and institution of reporting agency is in progress in the hill districts of Uttar Pradesh, Manipur, Tripura and other areas. More areas are further likely to be covered under the programmes for implementation of land reform measures. As soon as an area is cadastrally surveyed or settlement operations are completed in it, efforts will have to be made to set up adequate agency for preparation and maintenance of detailed land records on regular basis. In those parts where area statistics are based on complete enumeration, the charges of the primary reporters were fixed in the past on a consideration of the quantum of work involved in land revenue collection. These charges now need to be re-examined in the context of increase in their duties on account of development and welfare activities of the State, democratisation of administration and implementation of various land reform measures. In those parts of the 'non-reporting area' where complete enumeration is neither desirable nor feasible due to difficult terrain in which cultivation is sparsely practised, some system of sample survey could be devised to build up area statistics. The various problems involved in the improvement of area statistics are summarised below :

(a) **Strengthening of Primary Reporting and Supervisory Land Records Agencies.**—In the areas in which statistics of land-use and crop areas are based on complete enumeration, the large increase in the work-load on the primary reporting agencies at the village level and on their supervisory officers has adversely affected the collection of proper agricultural statistics. To enable them to cope with the increased work load, the Technical Committee on Coordination of Agricultural Statistics in India in 1949 recommended that the charges of the primary and supervisory agencies should be reduced by suitably increasing their strength. Subsequently, the first and second Conferences of State Directors of Land Records and

Agricultural Statisticians held in 1954 and 1960 respectively, and the National-State Agricultural Intelligence Board and the Standing Committee on Improvement of Agricultural Statistics both set up in the Ministry of Food & Agriculture in 1961 observed that unless the charges of the primary and supervisory land records agencies were redemarcated after taking into consideration the increase in their duties in the post-Independence period, no tangible improvement in the preparation and maintenance of land records, and therefore, in agricultural statistics, was possible. In pursuance of these recommendations the State Governments were requested by the Ministry of Food and Agriculture in October, 1961 to formulate their proposals for the strengthening of their primary and supervisory agencies and the Planning Commission's concurrence to include them in the States' Third Five Year Plan as a Centrally-aided scheme was obtained. They had, however, difficulties in accommodating this scheme under the overall ceiling for the Third Five Year Plan and in view of the National Emergency, the scheme was accorded low priority.

(b) **Institution of Complete Area Enumeration in Kerala, Orissa and West Bengal.**—The sample surveys conducted in Kerala, Orissa and West Bengal provide estimates of areas under different land uses and principal crops within a reasonable margin of error for the State as a whole and for major districts. In the absence of reliable estimates for individual items and for areas smaller than a district, realistic planning for agricultural development for specific areas and for smaller administrative and development units and the execution of the projects become difficult. The National State Agricultural Intelligence Board have recommended that the States in which estimates of area are obtained by sample surveys, should switch over to complete enumeration and for this purpose, revenue agencies should be strengthened. The question of institution of the suitable agency for complete field-to-field enumeration in these States was discussed by the Committee on Improvement of Agricultural Statistics also. The State Governments fully appreciated the need for complete field-to-field enumeration to provide dependable land-use and crop statistics for individual districts and lower units both for planning and administrative purposes. It was agreed that in Kerala the existing agencies of village officers and their assistants could be utilised for the maintenance of land records and collection of agricultural statistics by field-to-field enumeration, and for this purpose, their strength and the strength of their supervisory officers should be suitably augmented. In respect of West Bengal and Orissa, the consensus of opinion was that the village revenue agencies who had now come into existence after the abolition of intermediaries and were already maintaining land records for the purpose of revenue collection, might be utilised to collect data on land and crop areas also on field-to-field inspection basis.

The Working Group on Inter-Departmental and Institutional Coordination for Agricultural Production set up under the Chairmanship of Dr. Ram Subhag Singh, Minister for Agriculture (1963) has also recommended that "the provision made for strengthening the land records establishment in the eastern States and Kerala should be taken into account" in setting up proper village functionaries.

(c) **Sample Survey in Sparsely Cultivated Areas.**—As regards non-reporting area, the bulk of it is covered with dense forests and hills and is sparsely cultivated where cadastral survey and complete area enumeration might be both difficult and prohibitive from the cost point of view.

For such areas, suitable sampling techniques like the one recently tried in the hill districts of Uttar Pradesh, may be adopted to frame the estimates.

On the basis of the proposals received from the States, tentative estimates of the extent of increase needed in the strength of the primary and supervisory land records agencies and the field and supervisory staff needed for sample survey in sparsely cultivated 'non-reporting areas' and the estimates of cost thereon are given in Appendix IV.

Summary of Discussion

The Group appreciated the work done by the Standing Committee on Improvement of Agricultural Statistics in suggesting ways and means to providing reliable and comparable area statistics from the basic land records, but felt that the strengthening of primary and supervisory agencies was the key to all improvements in agricultural statistics and implementation of land reforms and developmental measures, and unless that was done the land records and agricultural statistics were likely to receive scant attention from the primary and supervisory agencies under the pressure of work, thereby affecting the quality of the basic material on which the projects for development have to be built. It was, therefore, imperative to accord a high priority to this scheme under the Fourth Plan. The Group further felt that the proposals for the strengthening of the primary and supervisory agencies had not received the attention they deserved from the States mainly due to their inability to allocate necessary funds for this purpose. It was reported that the States could not make provision for this scheme in their Annual Plans within the over-all ceiling for the agricultural sector fixed by the Planning Commission, as this scheme got a lower priority in comparison to other schemes and the States were also not sure regarding the quantum of financial assistance from the Centre to be continued beyond the Third Plan.

Recommendations

In the light of the above discussion, the Group made the following recommendations :

1. The strengthening of the primary and supervisory land records agencies is the crux of the whole problem of introducing lasting improvement in agricultural statistics, besides implementing effectively the various land reform, development and welfare measures. The system of maintenance of detailed land records on field-to-field enumeration basis needs to be introduced in Kerala, Orissa and West Bengal also, so as to obtain more reliable and comprehensive statistics which would be useful for planning and administrative purposes at the block level. Steps should, therefore, be taken immediately to strengthen these agencies as per details given in Appendix IV. In the few tracts where complete area enumeration was not feasible, sample survey should be conducted to obtain area statistics.
2. In view of the importance and urgency for strengthening these agencies, the schemes in this regard should be accorded high priority and action should be initiated immediately in 1964-65 to enable the States to take up these schemes on full scale under the Fourth Plan.

statistics such as recording of areas under mixed crops, fruits and vegetables, field and other bunds, long-duration crops, crops sown in one season but harvested in successive seasons, etc. Several other problems are also engaging the attention of the Committee. But in the absence of adequate and technically equipped staff, the States have been experiencing difficulties in implementing these recommendations.

The second conference of Directors of Land Records and Agricultural Statisticians held at New Delhi in September, 1960, had recommended that a fairly senior officer should be placed on special duty in each State to undertake the revision of forms and instructions in the Land Record Manuals for the collection of agricultural statistics. In order that these revisions are carried out and necessary background for implementation of other improvements in area statistics is created, it is necessary to make provision under the Fourth Plan for the appointment of the special officer and assisting staff in each State. Appointment of some staff for a period of a year or so may also be necessary for imparting training to the field and supervisory staff to collect and compile data according to the revised procedures. The printing of revised forms and manuals may also involve some additional cost.

Whereas adoption of uniform concepts and definitions and standardised classification will improve the reliability and comparability over time and space of area statistics and strengthening of agencies will improve their quality and timeliness, the value of the statistics could be further enhanced by proper programming of their collection and processing. At present the completion of area enumeration in all the villages under the charge of a primary reporter and compilation of the data at successive levels thereafter take considerable time and the area statistics based thereon become available much after the close of the agricultural year, with the result that they cannot be used for current planning and administrative purposes and for the purpose of crop forecasts. The area figures used for these purposes are only estimates based on the judgement of primary reporters and superior revenue and agricultural officers regarding weather and rainfall conditions, price position, seed availability, Government policy regarding agricultural production, etc., obtaining during the sowing period. More reliable figures can be obtained if the primary reporter is required to complete the crop inspection and compilation of the data in respect of different villages in different months according to a phased programme. From the preliminary to the final forecast the number of villages on which area estimates would be based will increase progressively adding to the precision of the estimates.

Another measure necessary to improve the quality of basic data is to rationalise the programme of supervision of the work of area enumeration. The Land Record Manuals in the different States make adequate provision for supervision by superior officers over the area enumeration work of primary reporters. But the villages and fields therein are generally selected for supervision by rotation according to a certain roster which give an idea to the primary reporters of the villages unlikely to be visited in a particular year, where the work is consequently liable to be neglected. An element of surprise can be introduced in the whole supervision programme by selecting villages and fields randomly for supervision. This would also serve another important purpose, in the sense that it would

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provide an assessment of the extent of unreliability of area enumeration due to neglect of this work by the primary reporters.

For planning the phased programme of area enumeration and its rationalised supervision and for processing of the data at different points of time when they are needed, some statistical staff at the State headquarters will be necessary.

Summary of Discussion

The Working Group took note of the commendable work done by the Standing Committee on improvement of Agricultural Statistics in suggesting revision in basic and abstract land record forms of the States to ensure collection of area statistics in the country according to standardised classification and uniform concepts and definitions. It was pointed out that in many States the implementation of the recommendations of the Committee on Improvement of Agricultural Statistics with regard to area statistics was held up for want of appointment of Technical Officers and other staff to finalise the revised forms and the instructions relating to them in the Land Records Manuals and to train the field and supervisory staff to collect and compile the data in the revised forms. In order that the valuable work done by the Committee was not lost, the need for appropriate action in this regard right in the Third Plan and in the Fourth Plan was emphasised. It was further suggested that the Ministry of Food & Agriculture should take up with the State Governments, the question of expediting the implementation of the recommendations.

The Group further appreciated the need for phasing of area enumeration and for rationalising the programme of supervision over the work of area enumeration. It was observed that some work in these respects had already been done in some States on a pilot basis and the time had now arrived when it should be taken up on State-wide basis. It was however, felt that unless the primary and supervisory land record agencies in the States were suitably strengthened, the States might continue to face difficulties in implementing these programmes on full-scale as had been the case hereto.

Recommendations

To sum up, the Working Group made the following recommendations.

1. The technical staff to finalise and introduce the revised land record forms and to train primary and supervisory agencies to collect and compile the data in these forms should be appointed in each State so as to ensure collection of agricultural statistics according to standardised classification and uniform concepts and definitions and to prepare the necessary background for effecting other improvements in agricultural statistics.
2. As the revisions in the land record forms and implementation of other recommendations made by the Committee on Improvement of Agricultural Statistics were basic to all improvements in area statistics in the country, immediate action is needed to implement them, and therefore, provision may be made in the Third Plan itself to initiate the necessary measures in this regard, and the Ministry of Food & Agriculture should take up with the

farmers is numerous enough to ensure direct contact with the individual farmers and their problems and if these are available for areas so small as villages and for individual farms within them, there is a larger probability that the farmers would be influenced into action along the lines proposed in the Plan. It is, however, impossible to provide specialist extension staff on the scale large enough to ensure individual assistance and advice. In the present context of development of the national extension agency, the specialist extension staff has to cover about 100 villages on the average and in order that this agency is in a position to advise the farmers effectively, it should have a clear statistical picture of the number and type of farms in individual blocks and of the planning techniques best suited to various farm types.

In order to plan utilisation of the resources available in the various planning units for the optimum advantage, we thus have to have, on the one hand, information detailed enough to build up realistic targets for the various development blocks and, on the other, equally detailed information on the number of farms within each block classified by type and the planning technique appropriate for each. Only then would the extension staff be in a position to advise the farmers effectively in the fulfilment of the targets. The farms may be classified by size, by pattern of land-use according as growing predominantly cash crops, foodgrain crops or devoted to animal husbandry, irrigated or dry, by resources in human, animal and mechanical power, capital, etc., and by specific proposals regarding planning techniques for each farm type given in the Plan. A breakdown of the production targets for each planning unit by farm types and their contributions to the total target is necessary if fuller and efficient use of the programmes made available under the plan is to be assured. The targets for individual planning units need to be geared up to the actual conditions and resources of the farmers within them. To meet this need, it is imperative to conduct a comprehensive census of the farms in the line with the F.A.O. World Census of Agriculture. The scope of this Census in India may be more ambitious at places than the F.A.O. Programme in order that the data so collected may serve adequately the purposes of planning and at the same time serve as bench-marks for evaluation of the progress of the Plan.

REQUIREMENTS OF DATA FOR PREPARATION OF VILLAGE PRODUCTION PLANS

Summary of the Note Received (C.D. & C-2)

Under the Third Plan there has been greater realisation of the importance of planning from below and increased emphasis has been laid on formulation of production plans for individual farmers and villages and on building up from these plans, the plans for the development blocks. This approach is supposed to be adopted more intensively in areas under Intensive Agricultural District Programme. But in the absence of detailed information regarding land-use, cropping pattern, human and cattle population, etc. for the individual farms and for want of the necessary techniques for preparation of farm plans, the progress relating to the formulation of production plans for individual farms and villages has been far from satisfactory.

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With a view to examine the present position regarding preparation of village production plans and to suggest suitable procedures for preparing such plans based on available resources, the Ministry of Food and Agriculture set up in December, 1962, a Study Team on Village Production Plans with the Agricultural Commissioner to the Government of India as the Chairman. The Team found that the "village production plans in most of the States existed only on paper as a mathematical exercise. Forms in which these plans are required to be prepared are applicable to the entire State irrespective of regional variations. In some of the States, elaborate instructions have been issued on the subject which instead of simplifying procedure have made the task complicated".

The Team has observed that there is lack of technical competence at the village or Block level for planning and implementing the village production plans. It has, therefore, been suggested that the job in each State should be performed by the Deputy Director of Agriculture assisted by a competent officer of the status of Agricultural Officer. The work can thus be taken up on a very restricted scale during the next two or three years. The Deputy Director of Agriculture would, however, associate the Block Agricultural Extension Officer in preparation of the plans, so that the latter developed the necessary experience and competence to take up the work on their own subsequently. The Team has also suggested the blue print of simple village production plans, which gives, *inter-alia*, details of essential statistical information required for preparation of production plans.

In view of the difficulties experienced in formulating realistic village production plans, the Working Group on Agricultural Statistics was requested to indicate what statistics were required at the village level for preparing efficient village production plans.

Summary of Discussions

In view of the need for data on size and structure of holdings and other related items like land utilisation, cropping pattern, number of livestock, number and types of agricultural implements, etc. for formulation and execution of plans for agricultural development on regional and operational units basis, it was emphasised that the data on number and size of operational holdings, number and area of holdings by tenancy and size of holdings, irrigated and unirrigated areas, crop areas, areas under different land uses, livestock population and agricultural implements, etc., should be collected for individual operational holdings by complete enumeration. It was noted that the opportunity provided for collection of detailed data for operational holdings for planning agricultural development at regional and farm levels, by the World Agricultural Census in the past, was unfortunately not availed of in India. The data for the first (1950) and the second (1960) Agricultural Census in India were collected only on a sampling basis as a part of the NSS normal rounds, giving estimates for the country as a whole or for group of States. In order that the required data for the type of planning the country is wedded to become available it was necessary that the ensuing World Agricultural Census of 1970 should be conducted in India on complete enumeration basis. The opportunity provided by the Agricultural Census could further be utilised for placing the agricultural statistics of the country on a firm footing, as a permanent measure, by planning the various enquiries

CHAPTER V

YIELD STATISTICS

EXTENSION OF CROP ESTIMATION SURVEYS ON IMPORTANT FOOD AND NON-FOOD CROPS

Summary of the Note Received (NSS-1)

The crop-cutting surveys by the random sampling method as evolved by the I.C.A.R. have been extended to more and more crops and areas during the last decade to obtain reliable estimates of yield per acre of crops. In 1961-62, about 95% of the area under cereals, 75% of pulses, 90% of sugarcane, 60% of oilseeds and 95% of cotton and jute each was covered by the crop-cutting surveys. The crops with regard to which the coverage now needs to be improved are small millets like ragi and kodokutki; pulses like tur, urad, moong, masoor and lytharus; and oilseeds like sesamum, rape and mustard, linseed and castorseed. The coverage with regard to tobacco and potato crops was also limited to a few States only. Appendix V shows for each State the crops for which either the survey is not conducted or the coverage is inadequate, alongwith the additional number of crop-cutting experiments required for obtaining reliable estimates of their yield at least at the State level.

At present more than 120 thousand crop-cutting experiments are conducted in the country, and the existing work-load is heavy enough to preclude entrusting of any more experiments to the existing field staff without detriment to the quality of the field work. The additional work as indicated in the above Appendix, could, therefore, be taken up only after the field staff in the appropriate State departments are suitably augmented. The additional volume of field work will also entail increased statistical work at the State and District headquarters. The requirements of additional staff both for field and statistical work are also shown in this Appendix.

For an effective check over the quality of field work, it is necessary that the superior staff should inspect a minimum of 30 per cent of the experiments. Half of this could be taken up by the departmental supervisory staff to serve as a routine administrative check, and the other half by the statistical supervisory staff of the State Governments and the N.S.S. Directorate as a quality check. A part of this inspection could be carried out on random sampling basis so as to tone up the quality of the field work and also to provide an independent estimate of yield. Taking into consideration the duration of the crop-harvesting seasons, the regional cropping patterns and the desirability of keeping the staff busy throughout the year, the randomised inspection programme could be divided into two parts—one comprising the crops for which estimates at the all-India level based on the results of the experiments supervised, could be attempted every year, and the other comprising the crops which could be taken up in three different groups by rotation in different years. The additional statistical supervisory staff needed in the States, is shown in Appendix VI. The scale of randomised inspection to be carried out by the statistical supervisory staff at the harvest stage is given in Appendix

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For an effective check over the quality of field work, it is necessary that the superior staff should inspect a minimum of 30 per cent of the experiments. Half of this could be taken up by the departmental supervisory staff to serve as a routine administrative check, and the other half by the statistical supervisory staff of the State Governments and the N.S.S. Directorate as a quality check. A part of this inspection could be carried out on random sampling basis so as to tone up the quality of the field work and also to provide an independent estimate of yield. Taking into consideration the duration of the crop-harvesting seasons, the regional cropping patterns and the desirability of keeping the staff busy throughout the year, the randomised inspection programme could be divided into two parts—one comprising the crops for which estimates at the all-India level based on the results of the experiments supervised, could be attempted every year, and the other comprising the crops which could be taken up in three different groups by rotation in different years. The additional statistical supervisory staff needed in the States, is shown in Appendix VI. The scale of randomised inspection to be carried out by the statistical supervisory staff at the harvest stage is given in Appendix

VII, and the additional supervisory staff needed therefor in Appendix VIII. With the proposed increase, the NSS staff could also inspect about twice the number of experiments indicated in Appendix IX as a free sample in the sense that they would be covered at any of the various stages of the field work.

Adequate training in the crop-cutting experimental procedure has also to be imparted at periodic intervals to both the primary and supervisory staff to ensure the quality of field work. Firstly, regular annual or seasonal training classes should be organised for the field staff. Secondly, for the junior statistical staff, a special course of training for a period of 3 to 4 months, preferably at a central statistical organisation, would be desirable in order to equip them with the knowledge of statistical methods employed in these surveys and the precautions to be taken to obviate various types of non-sampling errors. Besides, it will be helpful if the superior statistical staff who have a larger responsibility in guiding the field and statistical work, receive a refresher course of training at a central statistical organisation lasting for a period of 4 to 6 months depending on the extent of specialized training already received by them in statistical methods and crop-cutting procedures.

For conducting the crop-cutting experiments properly, the field staff should be in possession of all the experimental equipment. In many States, the present position regarding the supply of equipment to the field staff is far from satisfactory. Necessary steps should be taken to ensure the supply of all equipment to the field staff.

Summary of Discussion

The Working Group observed that the main gaps in the coverage of crop-cutting surveys on food and non-food crops were in respect of small millets, pulses, tobacco and oilseeds; specially the portion accounted for by mixed crops in Uttar Pradesh were left out. The Group was informed that in Uttar Pradesh crop-cutting surveys on sugarcane were confined to sugarcane factory areas and tracts which did not feed the factories but converted their crop into gur, were not covered by surveys. It was suggested that a smaller sample might be taken in such tracts also to make the estimates more reliable.

The Group observed that the quality of field work was not equally satisfactory in all the States and in some States a sizeable proportion of the experiments planned was not conducted. The scale of supervision exercised was also inadequate, though there had been some improvement in recent years, particularly in respect of the supervision carried out by the NSS Directorate. The importance of increased supervision at harvest stage to tone up the field work and to obtain separate yield estimates at least at the national level was also emphasised.

Any tangible improvement in the coverage of the crop-cutting surveys, the quality of the field work and the extent of supervision exercised, was considered difficult unless the field, statistical and supervisory staff in the States were strengthened and the statistical organisation incharge of crop-cutting surveys at the State level was suitably and adequately staffed. The need for strengthening the NSS Directorate to enable it to give proper guidance and training to the staff in the States and undertake randomised supervision at the harvest stage on an increased scale was emphasised. It

crops. The experience gained from these surveys shows that random sampling techniques are suited for collecting statistics of spices crops. In the case of pepper, cashewnut and cardamom, it is, therefore, proposed that sample surveys may be undertaken in all areas where they are grown, while in the case of ginger, turmeric and chillies the work is proposed to be undertaken in two stages: first on a limited scale to study the problems involved and to evolve suitable sampling techniques, second, on an extended scale to cover the entire area growing these crops.

During the Second and Third Five Year Plans, the States had organised pilot sample surveys, with the financial assistance of the ICCCI and ICACI for collection of data on area and yield of coconut and arecanut crops. These surveys are in progress in all the States which are important for these two crops. It will be necessary to continue these sample surveys in the Fourth Five Year Plan as a normal programme of the States.

Summary of Discussion

The Group noted the serious gaps in the data on area and production of fruit, vegetable and spices crops and their cultivation practices; and appreciated the pilot surveys conducted by the IARS on some of these crops in selected areas to evolve suitable sampling techniques to collect the required data. It was felt that the surveys on these crops such as orange for which suitable sampling techniques had already been evolved, could be extended to the entire producing areas. It was, however, realised that further pilot surveys in respect of some of the crops like apple, guava, etc., were needed to examine the applicability of these techniques on State-wide scale, while pilot surveys in selected areas were yet to be conducted in respect of some other crops. As soon as the stage of pilot surveys either in selected areas or on State-wide basis was over, the Group felt that the States should be enabled to take over these surveys as a normal routine under the technical guidance of the IARS. For some important fruit crops, it was suggested that one or two States should be covered in the Third Plan itself to gain experience for carrying out such surveys in the Fourth Plan on large scale. As regards vegetable crops, it was pointed out that some work had already been done particularly in respect of potatoes and onions and that the surveys could be extended immediately to other important States as far as potato and onion crops were concerned, and pilot surveys should be conducted to cover as many vegetables as possible during the Fourth Plan. The survey on vegetables proposed for Delhi State might be extended to one or two other important areas in the remaining period of the Third Plan itself.

Recommendations

In the light of the above discussions, the Group made the following recommendations:

1. The surveys on those fruit and vegetable crops for which suitable sampling techniques have already been evolved by the Institute of Agricultural Research Statistics, should be extended to all the producing areas.
2. The pilot surveys either in the selected areas or on State-wide basis should be carried out by the Institute of Agricultural Research Statistics in respect of those fruits, vegetables and spices

VII, and the additional supervisory staff needed therefor in Appendix VIII. With the proposed increase, the NSS staff could also inspect about twice the number of experiments indicated in Appendix IX as a free sample in the sense that they would be covered at any of the various stages of the field work.

Adequate training in the crop-cutting experimental procedure has also to be imparted at periodic intervals to both the primary and supervisory staff to ensure the quality of field work. Firstly, regular annual or seasonal training classes should be organised for the field staff. Secondly, for the junior statistical staff, a special course of training for a period of 3 to 4 months, preferably at a central statistical organisation, would be desirable in order to equip them with the knowledge of statistical methods employed in these surveys and the precautions to be taken to obviate various types of non-sampling errors. Besides, it will be helpful if the superior statistical staff who have a larger responsibility in guiding the field and statistical work, receive a refresher course of training at a central statistical organisation lasting for a period of 4 to 6 months depending on the extent of specialized training already received by them in statistical methods and crop-cutting procedures.

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Summary of Discussion

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2. The pilot surveys either in the selected areas or on State-wide basis should be carried out by the Institute of Agricultural Research Statistics in respect of those fruits, vegetables and spices

crops for which suitable sampling techniques for adoption on State-wide basis as a normal routine have not been evolved.

3. As soon as the stage of pilot survey is over, the States should be enabled to take over these surveys as a normal routine under the technical guidance of the Institute of Agricultural Research Statistics.
4. In order that the various surveys envisaged, are undertaken on the desired scale in the Fourth Plan, advance action should be initiated in the Third Plan itself.

Financial Provision

For the implementation of the above recommendations, the following financial provision during the Fourth Five Year Plan was considered necessary:

Scheme	No. of regions to be covered	Duration of the Scheme (in yrs.)	Expenditure involved per region (in lakh rupees)	Total expenditure (in lakh rupees)
I. States				
Fruit surveys	6	2	2.60	15.60
Surveys on cashewnut and spices crops		5		13.00
II. I.A.R.S.				
Fruit surveys	4	2	2.60	10.40
Vegetable surveys	4	3	2.00	8.00
Statistical staff for overall guidance and planning of Surveys		5		3.00
TOTAL				50.00

For Advance Action during 1964-65, a provision of Rs. 1.44 lakhs for the surveys on fruits and vegetables each was considered necessary.

SAMPLE SURVEYS FOR ESTIMATING PRODUCTION OF PRINCIPAL CROPS AT THE BLOCK-LEVEL

Summary of the Note Received (IARS-2)

With the adoption of Community Development Blocks as the units of planning and development, there has been a persistent demand for evaluating their performance in terms of physical achievement by obtaining the block-level estimates of crop production. But the number of crop-cutting experiments conducted at present is capable of giving estimates of yield-rates of crops at the district level at the most. Roughly 10 to 15 times increase in the present order of experimentation appears necessary to obtain

sufficiently reliable estimates at the block-level. Such a gigantic increase in the number of experiments would give rise to several organisational, administrative and technical problems which might be difficult to tackle. In situations like this, it is convenient and economical to take resort to double sampling in which a combined approach of conducting crop-cutting in a few number of fields and estimation of yields by eye-appraisal on a large number of fields, could be made. The IARS has accordingly launched pilot studies in 12 States with a view to studying the problems associated with this approach. The results of these studies will enable an assessment of the problems involved in estimation of yield-rates at the block-level and the method by which they could be solved within the existing administrative arrangements at minimum additional cost. The method evolved through these pilot studies could then be adopted for a country-wide survey to obtain block-level estimates of crop production.

The survey might cover 2 principal crops per block during the year. The procedure for conducting the experiments for block-level estimates could be analogous to that adopted in the normal crop-cutting experiments. The field work might be entrusted to the patwaris who are at present associated with the crop-cutting experiment in the States, and for obtaining eye-estimates the services of the VLWs could be utilised. Intensive supervision over the field work and the training of the field staff will be necessary to maintain the quality of the field data. For this purpose, and for analysis of the data collected, statistical staff will be needed at the district and State levels. A unit consisting of one statistician and 2 computers for a group of about 5 districts and 3 supervisors per district will be necessary for handling the work at the field level. The other items of expenditure will be supply of experimental equipment to each member of the field staff responsible for crop cutting experiments and labour charges for harvesting the experimental produce and compensation to cultivators.

Summary of Discussion

The Group was appraised of the consistent demand for block level estimates of crop production for judging performance of the different blocks over years, and the attempts made by the IARS to evolve a suitable sampling technique for the purpose was appreciated. It was pointed out that in view of the persistent demand for initiating some survey for obtaining block-level estimates of crop production, the Planning Commission had also formulated another scheme which envisaged only conducting of crop-cutting experiments with the help of the various agencies available at the field and supervisory levels. It was felt that the findings of the pilot studies being conducted by the IARS and those being sponsored by the Planning Commission would indicate the lines on which the country-wide survey would have to be planned. It was hoped that sooner or later the two surveys would be merged.

Recommendations

In view of the urgent need for obtaining block level estimates of crop production to judge the performance of the different blocks and to plan at regional levels for increased agricultural production, the Group made the following recommendations :

1. The pilot survey being conducted by the IARS to evolve a suitable sampling technique of crop-cutting surveys for obtaining

block-level estimates of crop production, should be continued during the remaining years of the Third Five Plan.

2. The pilot surveys being sponsored by the Planning Commission could also be conducted if found feasible under the existing strength of the primary agencies.
3. Adequate provision should be made under the Fourth Five Year Plan to conduct the surveys for block level estimates of crop production on country-wide basis by adopting the method evolved through the pilot surveys under the Third Plan.

Financial Provisions

The probable cost on account of taking the country-wide survey for obtaining the block level estimates of crop production was estimated at Rs. 300 lakhs for the whole of the Fourth Five Year Plan period.

CHAPTER VI

IRRIGATION STATISTICS

IMPROVEMENT IN IRRIGATION STATISTICS OBTAINED FROM LAND RECORDS

Summary of the Note Received (DES-4)

Like all other area statistics, the statistics of irrigated areas by sources and crops, as contained in Land Utilisation Statistics, flow as a bye-product of the land records prepared primarily for land revenue purposes. Naturally the reliability of irrigation statistics depends on the extent to which the particulars of irrigation are systematically and distinctly recorded at the field level and correctly aggregated at the village and higher levels in these records. Further, to ensure inter-State comparability of irrigation statistics, it is necessary to introduce in these records uniform concepts and definitions and standard classification regarding irrigation particulars. The Standing Committee on Improvement of Agricultural Statistics has examined the land records of the different States and suggested measures to remove defects in them so as to improve the quality and content of irrigation statistics in the country. The defects noticed and the measures suggested to remove them are brought out briefly in the following paragraphs.

In some States the areas of different land-use categories and crops are recorded in the same column of the basic village form, or the irrigated area of a crop is not sorted out from the unirrigated area. The congested entries make it difficult to obtain the village totals of the areas under different items including the irrigated areas of crops. While in most States, the source of irrigation is recorded in a separate column in the basic village form or is indicated by appropriate symbol or abbreviation, in Madras and Andhra region of Andhra Pradesh, the fields in the basic form are arranged according to class of tenure and settlement classification of land including grouping by registered irrigation sources. The sources of irrigation mentioned there, are as per settlement records and though care is taken to show in the remarks column the actual source also, chances of omission of the latter and mistakes in totalling source-wise irrigated areas for the village due to congestion of entries in the remarks column, are not ruled out. Such compilation errors are also probable in other States in which the source of irrigation is mentioned in the remarks column of the basic form. It has been recommended that the irrigated area of a crop and the source of irrigation should be recorded in separate columns or shown distinctly.

Provisions made in the basic village form and instructions incorporated in the Land Records Manual for giving details of irrigation sources, are far from adequate in many States. The ayacuts of tanks and wells are often not indicated according to the standard classification. Further, there is either no specific provision in the basic village form or the instructions in the Land Records Manual are lacking or incomplete for mentioning whether a tank is Government or private and whether a well is

Government or private, masonry or non-masonry, abandoned or in use, in use for irrigation or for domestic purposes, etc. Specific provision to note the method of irrigation (flow or lift, and whether the device to lift water is an electric pump, oil engine or a traditional one) is also not made in the basic form of many States.

The village-level abstract of crop-wise irrigated area is not prepared in Assam and Bihar. The abstract of source-wise irrigated area is also not prepared in Assam and Punjab at the village level. The statistics of crop-wise and source-wise irrigated areas in Assam, as given in Land Utilisation Statistics are compiled from the irrigation returns, and not the basic land records as in other States. To the extent the irrigation returns exclude the sources not under the control of Irrigation Department or for which irrigation rates are not assessed and include the areas assessed to water-rate and other areas which are not actually irrigated, the irrigation statistics of Assam are not accurate and comparable to those of other States. In Bihar, the abstract of source-wise irrigated area which alone is prepared, relates to gross irrigated area and not the net irrigated areas. In other words, this abstract gives the source-wise break-up of the same gross irrigated area, the crop-wise break-up of which should have been given in the crop abstract. Thus, the figure of net irrigated area and its source-wise break-up and consequently the figure of area cropped and irrigated more than once is not known for Bihar. Punjab, on the other hand, does not have any proforma for preparing the abstract of source-wise irrigated area at the village level. In this State, the village-level crop abstract gives by settlement classification of irrigation sources the irrigated areas of crops, and the source-wise totals for higher levels are obtained from the entries made in this crop-abstract. In such an arrangement it is not clear whether the compiler cares to see that if an area is irrigated by a well and is sown under irrigated paddy in the kharif season and irrigated wheat in the rabi season, it is counted only once so far as source is concerned, but twice so far as crops are concerned. The Committee on Improvement of Agricultural Statistics has now recommended suitable proforma for preparing village-level abstracts of source-wise irrigated area in Assam and Punjab and crop-wise irrigated area in Assam and Bihar.

Inter-State comparability of source-wise irrigated areas is also vitiated on account of the mentioning of some sources in local terms or according to local classification, without indicating the equivalent standard classes. While the local classification and nomenclature may continue in the basic form to enable collection of certain data needed for revenue purposes, it is necessary to ensure uniformity in the compilation of statistics of source-wise irrigated areas at the village and subsequent levels by adopting standardised classification in the abstract forms. In Punjab, for example it is necessary to adopt a uniform procedure in all the districts for bifurcating on some rational basis the nahari-chahi area into (a) area irrigated by canals and (b) area irrigated by wells. The term 'abi' in this State also needs splitting up into (i) 'jhil' or talab (tank) and (ii) 'other sources': jhil or tank being defined as any storage of water which is constructed for purposes of irrigation and from which water is taken to fields direct either by lift or flow without the help of canals, Ponds or 'jehars' not constructed especially for irrigation purposes but used as such, in a particular year, may be included under 'other sources' along with streams, etc. Further,

'sailabi' area which is not irrigated from any source but gets the benefit of retention of moisture due to flood or submersion should not be classed as irrigated as is done at present in Punjab. In Uttar Pradesh, the area irrigated from a canal, whether originating from a sagar or a reservoir or a dam across a river has to be treated as irrigated from a canal. But if water is led to fields direct from the sagar, the area has to be classified as irrigated from a tank.

Village-level abstract giving numbers of different irrigation sources and their distribution according to capacity, ownership, use and condition is at present not compiled in some States. Preparation of this abstract in a suitable form has been recommended by the Committee to facilitate the study of the trend in expansion of different irrigation sources.

The area cropped and irrigated more than once is recorded on field-wise basis in a few States only. In others, it is obtained at the village level as a difference of totals of crop-wise (gross) and source-wise (net) irrigated areas. Due to the crowding of entries in the crop columns of the basic form, it is feared that this area is not correctly computed by the method of subtraction. With a view to eliminating chances of error in compiling this area, the Committee has recommended suitable provision for entering it in the basic form or for striking its total page by page in this form.

For purposes of realistic planning and watching the progress of irrigation through major-medium and minor irrigation works it is necessary to compile the statistics of areas irrigated separately for these two categories. The distinction between them is generally made on the basis of cost or area irrigated. Under the Five Year Plans, an irrigation work costing less than Rs. 10 lakhs is treated as minor. In regard to works completed in the pre-Plan period, *i.e.*, before 1951, the term 'minor irrigation' is applicable to works that irrigate less than 4,000 acres each. The patwaris are generally not in possession of information on the cost of works to enable them to classify an irrigation work as major-medium or minor and specify them as such in land records. The Revenue Inspectors and the Tehsil authorities are, however, generally in the know of the names, costs and types of irrigation works that provide irrigation to the villages of their charge. They have, therefore, been required to classify the source-wise irrigated areas of the villages of their charge as reported by patwaris into (a) areas irrigated from major-medium works and (b) area irrigated from minor works.

Among the States in which detailed land records are not prepared, but sample surveys are conducted to obtain area statistics these surveys are utilised to obtain estimates of irrigated areas in Kerala. The estimate of the irrigated area for the State as a whole is, however, subject to a standard error of about 3 per cent. From April, 1963, the State has launched an expanded sample survey for estimating crop-wise and source-wise irrigated areas with a higher precision. In Orissa information relating to irrigated areas of crops and sources of irrigation is collected but it has not been analysed so far for obtaining estimates of irrigated areas in the State. In West Bengal, the schedules of the sample survey have no provision for collecting information on irrigated area. In Orissa and West Bengal the irrigation statistics still appear to be based on the old 'chowkidari system'. As an immediate improvement, the standardised classification and uniform concepts and definitions relating to irrigation

could be incorporated straightway in the schedules of the sample survey conducted in these States and the information collected and analysed. But as the estimates of areas irrigated under different crops and by different sources, even at the State level, are likely to be subject to large standard errors, it has been recommended that the system of complete area enumeration should be instituted in these States also as early as possible.

The various recommendations made by the Standing Committee on Improvement of Agricultural Statistics to remove the defects in irrigation statistics of the country, are in different stages of implementation in different States. It is feared that unless the land records agencies are suitably strengthened as suggested earlier, they are not likely to be fully implemented in the near future.

IMPROVEMENT IN IRRIGATION STATISTICS OBTAINED FROM PROGRESS REPORTS AND MEASURES TO RECONCILE THEM WITH THOSE OBTAINED FROM LAND RECORDS

Summary of the Note Received (WGMI-1)

In addition to Land Utilisation Statistics, the other source from which statistics relating to development of irrigation resources are available, is the Progress Reports furnished by State Governments on irrigation schemes taken up under the Plan. The Progress Reports on major-medium irrigation schemes give the figures of progressive irrigation potential created and utilised project-wise, while those on minor irrigation schemes give the gross area benefited from various types of schemes executed under the programme.

The figures of additional irrigated area obtained from the Progress Reports differ widely from those obtained from Land Utilisation Statistics. A type study carried out in Punjab by the Directorate of Economics & Statistics, Ministry of Food & Agriculture, revealed that the statistics of area benefited by minor irrigation reported in the Progress Reports did not represent truly the additions to irrigated area, for they also included (a) old irrigated area over which irrigation has been made more certain, (b) area benefited by water conservation-cum-ground water recharging schemes, and (c) area benefited by drainage, flood-control, etc. Further, while the irrigation statistics given in Land Utilisation Statistics make allowance for the losses due to depreciation of existing works as they relate to areas actually receiving irrigation, the figures in Progress Reports often refer to irrigation facilities created.

There are other factors which vitiate the comparison between the two sets of figures. The minor irrigation schemes are often not properly classified with the result that the figures are reported against wrong categories. The difference between gross and net irrigated areas is also not fully appreciated. The figures in the Progress Reports relate to gross irrigation potential in some cases and to net irrigation potential in others. Further while in some cases, the additional area benefited during a period is reported, in other cases a cumulative total from the very inception of the scheme is given. There is often some time-lag between the completion of a work and actual utilisation of irrigation potential. In the Progress Reports an area may be reported as irrigated as soon as a work is

completed. In the case of private works, such as wells, pump-sets, etc., the irrigation benefits are calculated on the basis of yardsticks, the accuracy of which is yet to be tested.

The problems relating to proper assessment of benefits accruing under the minor irrigation programme were discussed at the Minor Irrigation Regional Conferences held in 1958 and 1961. It was recommended that standard classification of minor irrigation schemes should be adopted, the concepts of gross and net irrigated areas and other terms used in irrigation statistics should be clearly understood; the progress of minor irrigation schemes should be reported in terms of physical units of works completed and additional area benefited; sample surveys should be conducted for evaluating the yardsticks of benefits; area going out of irrigation due to physical deterioration of existing works should be estimated periodically and a certain percentage of completed works and areas actually irrigated should be checked by supervisory officers. These Conferences also recommended that periodical meetings of the heads of departments in charge of irrigation schemes should be convened to review the progress, assess the benefits achieved and reconcile the discrepancies between the figures of additional irrigation facilities reported in Progress Reports and those obtained on the basis of Land Utilisation Statistics. It was also recommended that a single agency should be made responsible for collecting and reporting irrigation statistics and this agency should be provided with adequate statistical staff.

The Working Group on Minor Irrigation which also went into the question of effecting improvements in irrigation statistics contained in Progress Reports, has suggested to the States to adopt a standard classification of minor irrigation schemes for reporting irrigated areas. Benefits accruing from minor irrigation schemes may be divided into (a) new irrigated area, (b) old irrigated area over which irrigation is stabilised, (c) benefits in the form of water conservation, submergence of land or recharge of ground water, and (d) benefits by way of drainage, flood-control, etc. Whereas category (a) leads to increase in both irrigated area and production, the other categories result in increased production without any increase in irrigated area. It has been suggested that the statistics of benefits derived should be collected and reported separately for each of the above categories. To avoid confusion and ambiguity in collecting statistics, standard definitions for the important terms like gross irrigated area, net irrigated area, works completed, irrigation potential created, actual utilisation, etc., have been suggested. It has been emphasised that source-wise break-up of the gross irrigated areas should be given along with that of the net irrigated area.

Summary of Discussion

The Working Group appreciated the comprehensiveness of the note on improvement of irrigation statistics obtained from land records and desired that the States which still lagged behind in implementing the suggestions made therein, should be persuaded to take appropriate measures without further delay so that precise data on irrigation were available for the whole country. It was felt that much of the improvement in irrigation statistics in the country depended on streamlining the procedure for obtaining these statistics from land records. As regards Kerala, Orissa and West Bengal where sample survey is adopted for obtaining area

statistics, it was suggested that as an interim measure the standard concepts, definitions and classification accepted in regard to irrigation statistics should be adopted in the sample survey, although the ultimate objective should be to adopt complete enumeration in these States also for obtaining area statistics including irrigation statistics.

With regard to irrigation statistics based on returns of State Irrigation Departments, it was pointed out that the system of maintaining irrigation records differed from State to State. In some States like Madhya Pradesh, Uttar Pradesh, Punjab and Maharashtra there was a special agency in the Irrigation Department for collecting the project-wise statistics of irrigated areas by plot-to-plot enumeration, while in other States like Andhra Pradesh, Madras, Mysore, Kerala, West Bengal, Orissa, etc. the estimates of area given by the Irrigation Department were reported to be based on water released. It was further pointed out that in view of certain discrepancies, the Irrigation Ministry had discontinued, at the moment, the publication of the irrigation statistics obtained from State Irrigation Departments.

It was observed that there was considerable time-lag in the availability of irrigation statistics along with other area statistics contained in Land Utilisation Statistics. To reduce this time-lag, a suggestion was made that the States might be persuaded to allow a copy of the district returns to be sent direct to the Ministry of Food & Agriculture which could consolidate them expeditiously at the all-India level. This procedure was, however, considered to give rise to complications at the scrutiny and compilation stage. Alternatively, it was suggested that States might be persuaded to send an irrigation return, like crop-forecast returns, on a prescribed date.

The need for classifying the projects on some suitable criteria into major, medium and minor was recognised, but the propriety of the present method of classifying the projects on the basis of cost of construction was doubted as with the rise in the price level the same project was likely to cost higher and thus get upgraded. It was pointed out that taking the price changes into consideration new limits could be fixed to classify the projects and that the data would be comparable even when the new projects were classified on new limits. In fact, in keeping with the price-rise, the limit of Rs. 10 lakhs for minor irrigation works was already being raised to Rs. 15 lakhs under the Third Plan. An alternative suggestion to classify the individual projects on the basis of area irrigated from them was also made, but collection of reliable data on area irrigated, project by project, was considered difficult, particularly in respect of minor irrigation schemes. It was agreed that the problem of evolving a suitable criterion for classification of irrigation projects into minor and major-medium which would be acceptable on all accounts, was fraught with considerable difficulties, but whatever be the criteria the procedure suggested in the note on improvement of irrigation varieties based on land records for compiling statistics of irrigated areas separately for minor and medium-major irrigation sources was the most practicable.

There was some difference of opinion with regard to the allocation of area irrigated by tanks to major-medium and minor irrigation works. In the view of the Working Group on Minor Irrigation, the area irrigated through tanks should, by and large, be treated as area irrigated from

minor works, as all tanks costing less than Rs. 10 lakhs or having a command area of 4,000 acres were minor in nature, while bigger tanks or reservoirs had canals originating from them and areas irrigated from them were treated in the Land Utilisation Statistics as irrigated from canals and were thus automatically included under major-medium irrigation. The Working Group on Irrigation, Flood Control, Soil Conservation, etc. in River Valley Projects, on the other hand, held that the area irrigated from tanks should be apportioned between minor and major-medium works on 50:50 basis, as was done at the beginning of the First Five Year Plan. The consensus of opinion was that the tanks costing less than Rs. 10 lakhs or irrigating less than 4,000 acres would generally have no canal system originating from them and, therefore, the area irrigated from such tanks and recorded as such in land records, should be treated as irrigated from minor works. It was observed that ambiguity in the interpretation of the definitions of major-medium and minor irrigation works should not be allowed to vitiate our irrigation statistics. The Group felt that the tanks satisfying the criteria of cost or irrigable area laid down and supplying water to the fields without the intermediary link of canals should come under minor irrigation works. It was further stated that if this criterion was strictly adopted, the reconciliation of irrigated areas given in Progress Reports with those contained in Land Utilisation Statistics would be easier.

As the accuracy of the figures of benefits reported for the individually owned private works depends on the correctness of the yardsticks adopted, the Group recognised the need for evolving these yardsticks on a realistic basis, with due regard to regional variations, and verifying and checking them by random sample surveys. The Group also emphasised the need for States to initiate studies for making a precise appraisal of the yearly loss of irrigation potential due to silting-up in the case of storage schemes and due to depreciation or failure in the case of other schemes, so that the figures of net additional benefits could be accurately arrived at.

In the course of discussion, it was also enquired whether the usual procedure of fixing the targets of achievement in terms of irrigation potential created should be followed or the targets should be fixed in terms of actual utilisation of water. It was stated that if the former was followed the irrigated area guaranteed by a project should be treated as irrigated whether utilised wholly or not. The Group was of the opinion that while the target of achievement should be fixed in terms of potential created, it was necessary to have data of actual utilisation as distinct from potential created for judging the progress of various schemes, changes in cropping pattern, etc.

Finally the Group accepted the various suggestions made in the note on improvement of irrigation statistics obtained from land records as well as the suggestions made by the Working Group on Minor Irrigation. It was felt that the implementation of these suggestions would go a long way in improving the reliability and usefulness of irrigation statistics and in narrowing the gap between the irrigation statistics reported in Land Use Statistics and in Progress Reports. With regard to the suggestion for entrusting the work of collection and reporting of irrigation statistics to a single agency in a State, the Working Group felt that even if there was no single reporting agency, proper coordination could be exercised to obtain a uniform set of figures by one agency at the State level. This

coordination could be achieved by setting up Statistical Cell in the appropriate Department at the State level which will give exclusive attention to the problems of improvement in irrigation statistics including those of reconciliation between the different sets of figures.

Recommendations

To sum up, the Working Group made the following recommendations to improve the quality and content of irrigation statistics and to reconcile the discrepancy between Land Utilisation Statistics and Progress Reports with regard to these statistics :

1. The States should be enabled and persuaded to implement the various suggestions made by the Standing Committee on Improvement of Agricultural Statistics to remove the defects in irrigation statistics based on land records, i.e. irrigation statistics contained in Land Utilisation Statistics.
2. Similarly, efforts should be made both by the Centre and the States to implement the suggestions made by the Minor Irrigation Regional Conferences and the Working Group on Minor Irrigation to ensure the reporting of irrigation statistics in Progress Reports according to uniform concepts and definitions and standard classification, so that their usefulness is increased and the extent of their difference from the irrigation statistics contained in Land Utilisation Statistics is narrowed.
3. In the sample surveys conducted in Kerala, Orissa and West Bengal for obtaining area statistics, the data on irrigation particulars should also be collected according to the uniform concepts and definitions and standard classification and analysed to obtain estimates of irrigated areas under different crops and by different sources. But as the estimates based on these sample surveys are subject to large standard errors, even at the State level, the system of complete area enumeration should be instituted in these States also as early as possible.
4. The figures of source-wise irrigated areas compiled at the village level from the basic land records could be recast into (a) areas irrigated from minor irrigation sources and (b) areas irrigated from major-medium irrigation sources at the Revenue Inspector Circle or Tehsil level on the basis of information available there regarding cost, type and command area of individual irrigation works. The tanks costing less than Rs. 10 lakhs (which is being raised to Rs. 15 lakhs) or irrigating less than 4,000 acres would generally have no canal system originating from them, but would supply water direct to the fields and, therefore, the area irrigated from tanks and recorded as such in land records, should be treated as irrigated from minor works.
5. As the accuracy of the figures of benefits reported for the individually owned private irrigation works depends on the correctness of the yardsticks adopted for estimating such benefits, these yardsticks should be evolved on a realistic basis, with due regard to regional variations, and sample surveys should be conducted to verify their accuracy.

6. The States should initiate studies for making a precise appraisal of the annual loss of irrigation potential owing to silting-up of storage schemes and depreciation or failure of other schemes, in order that the figures of net additional benefits are accurately arrived at.
7. To reduce the time-lag in publication of irrigation statistics at the national level, States may be requested to consider the feasibility of sending an irrigation return, like crop-forecast returns, on a prescribed date each year.
8. As irrigation statistics are at present collected by more than one agency at the primary level, it is necessary to exercise proper coordination to obtain uniform set of figures at the State level. For this purpose, a Statistical Cell in appropriate department in each State should be set up. This Cell will give exclusive attention to the problems of improvement of irrigation statistics including those of reconciliation between the different sets of figures.

Financial Provision

The cost on account of creation of Statistical Cells in appropriate departments in each State for effecting improvements in irrigation statistics, is estimated at Rs. 15 lakhs during the Fourth Plan period. The survey for verifying and revising the yardsticks on a realistic basis, could be undertaken as a part of the survey recommended in the next Section for assessment of irrigation benefits. This sample survey could be entrusted to the NSS Directorate which is responsible for organising large-scale sample surveys in the field of agriculture. In fact, provision for such a survey is already made in the Third Plan, but the NSS Directorate has not been able to give it necessary priority.

ASSESSMENT OF ADDITIONAL AREA AND PRODUCTION FROM IRRIGATION WORKS

Summary of the Note Received (NSS-2)

Sample surveys for assessing the benefits accruing from new irrigation projects were initiated by the Indian Council of Agricultural Research and were pursued by the Directorate of National Sample Survey after they were transferred to the latter in 1953. The Directorate of NSS has so far carried out 11 surveys—3 on masonry wells, 2 each on pump-sets and small tubewells, 1 each on large tubewells, dams and channels, and tanks and 1 each in the development areas of Bihar and Rajasthan. The primary object of these surveys has been to ascertain the number of works functioning out of those reported to have been constructed and to estimate the area benefited.

These surveys have established the feasibility of adopting sample survey technique for assessing the achievements reported in respect of irrigation works. However, they have not covered all the States simultaneously or continuously over a period. They have further been confined to certain categories of minor irrigation works, mostly private owned works. They have, all the same, high-lighted the need for organizing

continuous comprehensive checks of the irrigation projects by an independent agency with a view to assess the additional area brought under irrigation and to study other related aspects like change in cropping pattern and increase in yield due to irrigation. The scope of the survey may further be extended to include assessment of (a) areas benefited by drainage schemes, (b) benefits derived from the schemes stabilising existing irrigation facilities, (c) loss of irrigation potential due to silting-up of storage schemes and depreciation of old irrigation facilities, data on which are not obtainable from Land Utilisation Statistics.

The work of assessment covering the various aspects of irrigation requires expertise and objectivity in reporting and has to be planned carefully by (i) extracting maximum possible information from official records and wherever necessary by improving the system of reporting and enlarging its scope, particularly with regard to items which are simple and direct in nature; and (ii) organising sample surveys to obtain information of complicated nature. The programme of sample surveys may involve the following phases of work :

- (i) Spot verification to ascertain the functioning of works;
- (ii) Ascertaining the area irrigated over different years;
- (iii) Studying changes in cropping pattern as a result of irrigation;
- (iv) Ascertaining whether any irrigation works are going out of use; and
- (v) Organising crop cutting experiments for estimating the additional yield due to irrigation and for revising the yardsticks of irrigation benefits.

The minimum objective would be to assess at all-India level the progress made by each important type of irrigation works, and at the State-level the progress made by all the types taken together. The scope of the survey in the initial stages could be confined to irrigation works undertaken in the Second and Third Five Year Plans. The extent to which the scope and objective can or need to be met annually or need modification could be examined in the light of the gaps in the availability of data, the resources available in terms of funds and personnel, and the results of the preliminary studies.

Intensive pilot studies will have to be undertaken for deciding the broad technical approach, its variation from State to State to meet the local requirements, the sampling plan, the questionnaire, the programme of field work and other related details.

According to rough estimates, the work of sample survey will require a man-power of about 150 primary field workers, besides supervisory and statistical staff for planning and guiding the surveys and analysing the results.

CROP-PATTERN ON AREAS IRRIGATED BY INDIVIDUAL PROJECTS

Summary of the Note Received (PC-1)

A study of the cropping pattern under different types of irrigation projects is necessary for planning optimum utilisation of irrigation resources. The important aspects of this study which need immediate

attention are (i) cropping pattern on areas irrigated by different categories of projects in similar rainfall and soil zones and (ii) relationship between irrigable area and cropping pattern. The study on item (i) may be extended to cover (a) variations in soil types and (b) irrigation works other than those included in the CWPC statistics, which already give soil-classification of areas served by individual projects covered thereunder. Under item (ii), a careful analysis of (a) variation in area irrigated per unit volume of water for similar projects in the same soil-climatic region and (b) difference between the planned and the actual irrigation, would appear necessary to provide some indication of the relative importance of the various factors, like crop pattern and efficiency of water-use, which determine the area irrigated per unit of water under given soil and climatic conditions.

STUDIES ON EVALUATION OF IRRIGATION BENEFITS

Summary of the Note Received. (PEO-1)

Evaluation studies are essentially oriented to problems of implementation, execution and impact of action or development programmes. Evaluation of an irrigation project may be done at every phase of its completion or every aspect of its operation. The relevant phase of study in respect of major and medium projects may be potential created and developed, utilisation of the potential improvement in land-use and farming, and relationship of benefits to costs. For minor works owned by the beneficiaries, assessment of some of these phases like potential created may not be as relevant as for the larger projects. A study of any of the various aspects may be conducted in terms of physical data like acreages, volume of water, etc. or financial data like investments returns and costs, or both. A study covering the whole range of objectives may be more relevant in respect of large sized works recently completed or almost completed. In respect of works completed in the distant past in which the transitional and gestational problems of development and adjustment might have been solved in some way or other, the more relevant aspects of study are impact of irrigation and cost and benefits. Data for assessment of potential and development of irrigation in respect of new projects may be obtained initially from the project authorities and later verified in small areas. It may be essential to collect field data from the households as well as from the sources like wells in villages. For time comparison back period data on cropping pattern can be collected from village records and from households during the course of inquiry.

Irrigation benefits has to be studied separately for kharif and rabi seasons as both water requirements of the crops and water potential of the same irrigation work vary in the two seasons. Further, additional irrigation implies not only extension in terms of area but also in terms of intensity of irrigation. Attempt should also be made to project future changes in the cropping pattern and also to take into account time-dimension in the development of irrigation. The study of change in the cropping pattern should also go into changes in crop rotation.

The benefits achieved have to be judged against the targets fixed and should take into account the time dimension allowed for development. The targets for achievement should take into account the irrigation potential already created, the year and month (in relation to the sowing season)

when it was created and the time pattern expected for the utilisation of the irrigation potential.

In evaluating the efficiency of different types of works based on benefit-cost ratio, the flow of output or benefit in the different years as well as the flow of costs of operation, depreciation charges and capital charges have to be considered, the present value of both the flows estimated after discounting, and ratios of benefit to cost built up. This approach is very different from the financial forecasting returns, for it has to take into account the net value of additional agricultural production, additional production from new resource-based industries like sugar making or cane crushing and additional employment generated both in the construction phase of the project and in the irrigation process of the farmers. While the general 'present value' approach is accepted, the importance of knowing the time path of the ratio over years should not be under-stressed and in evaluating additional production, etc., allowance should be made for the areas submerged by the project.

The evaluation studies of irrigation benefits involve diverse problems, as the benefits come from various types of irrigation works differing in nature, character, cost and capacity. While wells, small tanks and pump-sets are fairly well dispersed and privately owned, irrigation benefits from canals, big tanks and tubewells flow through State owned and constructed major and medium irrigation projects. The pattern of operation, distributory system, system and method of construction and maintenance of field channels, and system of water charges differ even between the State-owned works. It is, therefore, difficult to plan and design any comprehensive area study to cover all projects. The best and more manageable course is to select out problems as realistically as possible, keeping in view the needs of data, the time available for study and the use to be made of results, and then to design the sample and the field investigation.

Summary of Discussion

It was felt that as the scope of the sample survey for assessing the benefits derived from irrigation would be confined to those items only on which information was not already available from revenue and irrigation records, it would be necessary to formulate a programme of work for culling out and coordinating the information available in the official records. The work of coordination of irrigation statistics at the district level could be entrusted to the Zila Parishad which should maintain a close liaison with all the executive agencies in charge of irrigation programmes in the district and develop an appropriate reporting system to secure the necessary data. A Central Committee of the concerned Advisers would also prove helpful in effecting necessary coordination and tackling the various problems of improvements in irrigation statistics including conducting of sample surveys for assessment of irrigation benefits.

The Group further appreciated the importance of undertaking study of the cropping pattern in different types of irrigation projects and it was suggested that the sample survey to be undertaken for assessment of irrigation benefits should take into account this aspect also.

The need for problem-oriented evaluation studies of irrigation benefits was recognised as these studies provided useful material for the study of the economics of the projects, the achievements against the targets set for

them, their impact on the economy, and the difficulties faced at different stages during the operation of the projects and remedies thereof.

Recommendations

The following recommendations were made with regard to assessment and evaluation surveys on irrigation :

1. Sample surveys should be conducted on a continuous basis in the different parts of the country to assess both old and new areas brought under irrigation, increase in yield rates of crops due to irrigation, and changes in the cropping pattern. The sample surveys undertaken for assessment of irrigation benefits may also take into account the study of cropping pattern under different types of irrigation projects and provide necessary data for fixation of yardsticks of benefits accruing from different types of irrigation works with due regard to regional variations.
2. The scope of the sample surveys may be confined to those items on which information was not already available from revenue and irrigation records. An appropriate system for culling out and coordinating the information already available in official records and for effecting necessary improvements in them should be established. This system could be worked through the Statistical Cell which is recommended to be established in appropriate department in each State. This Cell will also be responsible for organising the sample surveys for assessment of irrigation benefits in cooperation with the NSS Directorate.
3. The work of coordination of irrigation statistics at the district level could be entrusted to District Administration which should maintain a close liaison with all the executive agencies incharge of irrigation programmes in the district and develop an appropriate reporting system to secure the necessary data.
4. A Central Committee of the concerned Advisers should be set up to effect necessary coordination and to look into the various problems of improvement in irrigation statistics including conducting of sample surveys for assessment of irrigation benefits.
5. Problem-oriented evaluation studies on irrigation benefits should continue to be conducted as they provide a fair assessment of the problems faced in the execution of the projects and the impact of the projects on the economy.

Financial Provision

The probable expenditure during the Fourth Plan period for setting up of Statistical Cells in the States to deal with the problems of improvement of irrigation statistics has already been estimated at Rs. 15 lakhs in the preceding Section. The expenditure on account of the sample surveys for assessment of irrigation benefits and for taking other measures for improvement of irrigation statistics may be estimated at Rs. 56 lakhs comprising Rs. 15 lakhs on the statistical staff at the State headquarters and at the Centre, Rs. 40 lakhs for field work and about 1.00 lakh for experimental equipment.

CHAPTER VII

ASSESSMENT OF BENEFITS OF IMPROVED AGRICULTURAL PRACTICES

ESTIMATION OF COVERAGE OF IMPROVED SEEDS AND ADDITIONAL PRODUCTION THEREON

Summary of the Note Received (WGIS-1)

The States generally furnish lumped figures for areas under improved seeds, of various crops and the figures reported are not reliable. In the absence of reliable information for individual crops, it is difficult to phase the future coverage of improved seeds. The inclusion of "natural spread" in the figures of coverage of improved seeds presents further difficulties as one is not sure of the purity and quality of such seeds. Unless records are available to assess areas covered by seeds produced and distributed by authorised agencies, it is not possible to get correct assessment of additional coverage and production through use of improved seeds. In order to obtain reliable data of coverage under improved seeds, the areas for which registered seeds have been distributed by approved agencies should be separately estimated and there should be a systematic record of such distribution. The term 'improved strain' may include only those areas where seed has been renewed from a recognised institutional agency within a period of five years for a predominantly self-pollinated crop, three years for a partially cross-pollinated crop and every year for a predominantly cross-pollinated crop.

The yardstick concept as at present adopted for assessing the additional production through use of improved seed, does not give reliable estimates, although the data available from demonstration trials conducted at block level might be utilised to get some estimate of expected additional production through the use of improved seeds. Survey for determining the extent and use of improved seeds and their quality and additional production achieved needs to be carried out in respect of important crops like rice, wheat, jowar, cotton, jute, groundnut and sugarcane. This survey should also bring out definite and authoritative information on specific areas where currently improved varieties in the approved list of States Seed Saturation Programme are unpopular either on account of unsuitability or lack of particular desired improvement.

STATISTICS OF FERTILIZERS AND OTHER MANURING PRACTICES

Summary of the Note Received (WGMF-1)

Statistical data on demand, supply and efficiency of manures and fertilizers have an important role to play in the proper planning of indigenous production, import, consumption and distribution of fertilisers. Reliable and comprehensive data on the trend of consumption and recommended doses of fertilizers for the various areas in each State, areas where consumption of fertilizers is poor and the factors which inhibit larger con-

sumption, rainfall, irrigation and agro-climatic conditions, arrangements for credit and distribution of fertilisers, etc. are necessary for formulation of targets of consumption and for taking decisions regarding location of plants for production of different types of fertilizers. Thorough knowledge of the prices in the exporting countries and their seasonal movement is essential for properly timing the placing of contract on foreign suppliers and the schedule of shipments, so that these may not conflict with the home requirements of the exporting countries. It is also necessary to know for foreign countries the subsidies given to the consumers and the relationship between the prices of agricultural commodities and fertilisers so as to keep a watch over ex-factory and consumers' prices of fertilisers within the country. A knowledge of the trend of prices of raw materials used in the manufacture of fertilizers, the general level of cost of production and import prices of comparable fertilisers is helpful in deciding the prices to be paid to the indigenous producers for procurement for the Central Fertiliser Pool and for keeping a watch over the trend of prices of those fertilizers which are not handled by the Pool. Fixation of prices of fertilisers handled by the Pool has to be based on consideration of prices paid for procurement from both internal and external sources, avoidance of loss to the Pool, insurance of economic returns to the cultivators and incentives to distributors for undertaking sale of fertilizers.

At present information only on some aspects of fertilizers is collected. Some data on phosphatic and potassic fertilizers are available mainly in the publications of the Fertilizer Association of India. The State Trading Corporation furnish some information on potassic fertilisers, rock-phosphate used in the manufacture of superphosphate, etc. The information collected relates to imports of various fertilisers and their value, consumption of fertilizers, contracts placed on foreign suppliers and rates at which various imports are paid for, production of indigenous factories, and despatches by the factories and the regional offices, etc. Even this little information which is available is not systematically tabulated and analysed. The data which are further needed for proper planning of the targets in respect of fertilizers and their achievements relate to import prices, prices paid to indigenous producers, quantities of fertilizers imported, quantities produced internally, requirements and allotment made and quantities actually supplied and lifted by the States, stocks held in godowns and factories, actual consumption and carry-over of stocks of different fertilizers. Data on input-output ratio of fertilizers, optimum doses of fertilizers required for different crops in different agro-climatic regions, quantities of plant-foods needed per acre of irrigated and unirrigated areas and the types of fertilizers used, and district-wise and crop-wise use of various fertilizers and fertilizers-mixtures, are needed for planning the proper utilisation of the fertilizers.

While information regarding quantities of urban compost prepared and distributed and use made of sewage water for irrigation purposes is being collected, the estimates of potential and actual production of farm-yard manure and rural compost and area green-manured, as available at present, are mostly based on surmise of the agricultural extension agencies of the States. The Indian Council of Agricultural Research had formulated a pilot scheme for sample survey for estimating the production of compost and farm yard manures. This scheme needs to be implemented. Provision also needs to be made in the village land record forms to collect data on area green-manured. Efforts have also to be made to collect

authentic data on requirements of green manure, seed and extent to which they are locally available, cattle-dung and urine voided, quantities of dung used as fuel, etc, quantities of other agricultural, household, farm and industrial wastes which could be used as manure.

The Fertilizer Division of the Department of Agriculture in the Ministry of Food and Agriculture is responsible for formulation of targets of consumption of fertilizers, maintenance of proper liaison with the Ministry of Petroleum and Chemicals in regard to creating indigenous capacity for the production of fertilisers, operation of the 'Central Fertilizer Pool' as a scheme of State Trading Corporation for procurement from internal and external sources nitrogenous chemical fertilizers for supply to States for distribution to cultivators, and production and distribution of urban compost and utilisation of sewage water for irrigation and sludge for manuring. The G.M.F. Division in the Department of Agriculture is responsible for development of local manurial resources, viz., green manuring, rural compost and composting in bigger Panchayats. The aspects of agronomical research including use of fertilizers and fertilizer demonstration on cultivators' fields are looked after by the Indian Council of Agricultural Research. While the Indian Council of Agricultural Research will be responsible for undertaking the various researches with regard to fertilizers, the Fertilizer Division in the Ministry of Food and Agriculture needs to be suitably strengthened to enable it to fill the important gaps in the fertiliser statistics of the country. This Division has at present a small statistical section consisting of one Senior Technical Assistant and one Senior Computer. Proposals made in the past to create in this Division, a well-organised Statistical Cell with a Statistical Officer and three Senior Technical Assistants have not fructified. In order that the use of fertilizers for increased agricultural production in the country is not allowed to suffer for want of statistical information on the various aspects of fertiliser use, it is imperative that this Cell is established at least in the Fourth Plan.

ASSESSMENT OF THE BENEFITS OF SOIL CONSERVATION, DRY FARMING AND LAND RECLAMATION MEASURES

Summary of the Note Received (WGSCLR-1)

For proper planning and execution of soil conservation programmes, it is necessary to study production as a function of soil type, soil-conservation system and time-spread after adoption of a soil conservation measure, and to develop measures and yardsticks, standards and criteria in respect of soil conservation measures. It is useful to find out the most paying combination of different levels and systems of water utilisation and soil conservation measures for varying soil and agro-climatic conditions. In order to assess the benefits from soil conservation measures like contour bunding, terracing, ravine reclamation, etc. it is necessary to obtain estimates of gain in yield-rates of different crops for different agro-climatic regions and for different time-spreads after adoption of the measure. Collection of similar information in respect of dry farming and reclamation of waste-lands is also necessary. Appropriate surveys will have to be designed to collect data on these items and a suitable Statistical Unit is needed in each State for planning and guiding such surveys and for analysing the data collected.

It will be helpful to associate with the collection of data, the soil conservation technicians who are conversant with soil science and agronomy to identify specific soil and climatic variations and collate and correlate the data collected on them.

SAMPLE SURVEY FOR THE ESTIMATION OF AREA BROUGHT UNDER IMPROVED AGRICULTURAL PRACTICES

Summary of the Note Received (NSS-3)

In view of the need for data on coverage of area under the various improved agricultural practices and increase in production due to these practices, the Directorate of National Sample Survey carried out pilot studies in Andhra Pradesh and Uttar Pradesh during 1958-59, to study the possibility of estimating areas under these practices through sample survey. Encouraged by the results of these pilot studies, the Working Group on Community Development Statistics recommended that steps should be taken to undertake sample surveys for estimating area brought under improved agricultural practices. Surveys are being organised in the various States since 1961-62 for estimating areas brought under specified improved practices. Provision is also made in the schedules to ascertain the reaction of cultivators with regard to various aspects of improved practices. The coverage of the survey by States during different seasons of 1961-62 and 1962-63 and the States in which it is proposed to be continued during the Kharif of 1963-64 are given in Appendix X.

The survey is carried out generally under the technical guidance of the State Statistical Bureaus in collaboration with the Directorate of National Sample Survey. Primary field work is generally assigned to Progress Assistants, though in some States services of VLWs are also utilised. The VLW is, however, not considered a suitable agency for the field work of this survey. The District Statistical and Supervisory Officers are trained at State headquarters and they in turn impart training to Progress Assistants for conducting the survey. The N.S.S. Directorate participates in the training of the staff at the State headquarters and, wherever possible at the district level also. The NSS Directorate also carries out some supervision mainly to observe methodological and technical aspects of the survey.

The survey at present is confined to three most important items, namely, improved seed, fertilizers and manures, and insecticides though in some States green manure, oilcake, etc. are also covered. However, there are various other types of aids which are being provided and, therefore, ways and means have to be found out to include them also. Most of the data are being collected by enquiry method, though provision has been made to have a spot check for about 25% of the fields in the selected cultivators' holdings. It is, however, difficult to verify the application of such aids as fertilizers and manures by direct observation on the field. In the case of improved seeds also it has not been possible to properly identify them on the fields particularly to assess the extent of purity in the improved strains. Improved seed propagated through natural channels has been the most difficult item to tackle. It has been found difficult to ascertain from the cultivators the year and season during which he had obtained the nucleus seed from the Government Department. On the

other hand, seed sold in the market as improved category has to be completely omitted as it is not possible to verify its source. Further, the possibility of mixing the improved seeds with local strain of similar type cannot be ruled out.

The results of survey so far conducted have proved to be of considerable use to the States as they reveal the real position with regard to spread of improved agricultural practices in the States. It is desirable that the survey should now cover all the important improved practices and should be extended to the entire area of a State and carried out on a regular basis. Based on the experience gained so far state level estimates of reasonable precision may not be obtained with a sample of about 80–100 blocks per State, four to six villages in each sample block, and six to eight resident cultivators in each selected village. It is necessary to have in each sample village a complete physical verification of the information in the case of at least two cultivators.

Supervision over the primary field work may be exercised by District Statistical Officers. The statistical staff in charge of tabulation at the State headquarters may also participate in the supervision in order to ensure uniformity of standards and procedures. To ensure efficient conduct of the survey, it may be desirable to set up a State-level Technical Committee comprising representatives of the State Agriculture, Development and Statistics Departments, and the N.S.S. Directorate, which should meet periodically to finalise technical details of the survey and to review the progress of the field work.

Experience has shown that the statistical work relating to the planning of the survey, finalisation of schedules, selection of blocks, scrutiny, and analysis of the data collected is very heavy. A separate Statistical Unit is needed in each State in the Department dealing with the surveys to cope efficiently with the whole work. Corresponding to the quantum of work, it appears necessary to have a unit comprising one Statistical Officer, two Statistical Assistants and six Computers, for carrying out the statistical work in each State. The N.S.S. Directorate will associate itself with all stages of the work for ensuring uniformity of concepts and standards. In particular, it will participate in the programmes of training and to the extent possible undertake supervision by its own staff, largely to serve as an over-all quality check. The coordination of the results at the all-India level will also rest with the N.S.S. Directorate. For this purpose a provision for the Central Coordinating Unit is necessary in the N.S.S. Directorate. This unit will be headed by an Officer of the rank of Deputy Director assisted by two Statisticians and four Statistical Investigators and other staff.

PROBLEM-ORIENTED DIAGNOSTIC STUDIES ON IMPROVED AGRICULTURAL PRACTICES AND LAND IMPROVEMENT MEASURES

Summary of the Note Received (PEO-2)

Diagnostic studies are different from large-scale estimational surveys inasmuch as the former have their focus on certain problems and issues requiring observation and analysis in depth. The methodology of diagnostic studies should, therefore, be derived from the nature of the problems to be studied and the hypothesis formulated for analysing them.

Since improved practices and land improvement measures are, by and large, to be studied in the context of relevant plan programmes and their implementation through extension agencies, such studies should normally be expected to throw some light on remedies to problems in these fields, and not merely end with an estimate of the extent of the problem. Data requirements will, therefore, be large, more intensive and include qualitative information also. Investigation in such depth is generally possible in surveys with a somewhat restricted coverage of area-population. It would, however, be desirable even in such limited coverage to have a suitable cross-section of the different types of situations. The instruments of observation will generally include not only straight schedules, but also questionnaires and qualitative reports at different levels. In most of such surveys, data collection even at the household level involves some judgment in terms of recommended norms, programmes, practices, etc.

A serious problem that will face any field investigation, whether of diagnostic or estimational type, is the proper definition and identification of the practices and measures that are recommended in a particular area. Such judgment will, obviously, have to be made at local levels, particularly, since recommendations are supposed to be related to the local problems. It is possible to tackle all these problems in a satisfactory manner only through the employment of well qualified investigators and keeping a regular supervision, guidance and communication between them and those in charge of the study. With increasing complexity of the programme, the interaction among the practices and measures is becoming increasingly important and needs to be studied much more in future. The actual specification of the problems that are to be studied should preferably take into consideration the views and felt needs of the policy makers, programme formulators and the administrative agencies operating in these fields.

USE OF DATA COLLECTED IN NORMAL CROP-CUTTING SURVEYS FOR ASSESSMENT OF AREA AND PRODUCTION OF IMPROVED PRACTICES

Summary of the Note Received (IARS-3)

Information on extent and source of irrigation, amount and type of manures and fertilisers applied, variety of seed soil-type, bunding, etc. are collected in respect of fields selected for the normal crop cutting surveys. In some of the States data collected on most of these items are also regularly tabulated. With expansion in the statistical staff suggested in Chapter IV, other States should also be able to take this tabulation regularly. The sample-size for each individual item would further expand with introduction of crop cutting experiments for estimation of crop-yields at block level and as a result of crop cutting surveys in IADP districts. In the Bench-mark and Assessment Surveys under IADP Programme, data are further collected on size of cultivators' holdings, cropping pattern in holdings of different sizes, irrigation facilities available and utilised, manurial and fertilizer practices followed, quantities of different manures and fertilizers consumed and rates of application for different crops, incidence of plant diseases and pests and extent of adoption of plant protection measures, quantities of improved seed, fertilizers, fungicides, pesticides and agricultural implements received by cultivators, proportion of agricultural produce disposed of and mode of disposal, extent

of agricultural and non-agricultural credit availed of by the cultivators, and current and capital expenditure for agricultural purposes and the extent to which they are met from own source or borrowings.

In view of these data being collected or possibility of their being collected where already not done, they should be analysed regularly to serve as an additional source of the estimates apart from those obtained from specially designed surveys for assessment of benefits of improved agricultural practices.

Summary of Discussion

It was pointed out that the Ministry of Community Development and Cooperation was interested in having estimates of area benefited by improved agricultural practices not only for the State as a whole but if possible, for individual districts and development blocks also. While designing the present surveys, the amount of work involved was underestimated and if the district and block level estimates had to be framed, a simplification of sampling procedure as well as strengthening of statistical staff would be necessary. It was further observed that the Central Team on Agricultural Production Programmes, 1963-64, which visited the States, had suggested conducting of sample surveys for estimation of areas under improved practices. In view of the usefulness of the results of the surveys for planning and development purposes, it was considered desirable to extend these surveys to the entire area in each State and to more improved practices. The surveys in future should cover improved seed, manures and fertilizers (including rural compost and green manuring), dry farming and plant protection measures. As regards field-work, it was felt that the staff of the Agriculture Department in the States would be the ideal agency, but as they were generally not available for this work, it was agreed that the field work might be entrusted to the Progress Assistants, and to the VIWs after necessary training. In the absence of both these agencies, the field staff of Agriculture Department should be utilised. It was further emphasised that the Agriculture Department should make necessary arrangement for effective supervision over the field work.

As regards the main concepts and definitions of the terms arising in the collection of statistics of area under improved varieties of crops the Working Group accepted the suggestions made by the Technical Working Party set up in the Ministry of Food & Agriculture in 1957. That Technical Working Party had recommended that as a working basis only those varieties might be accepted which had been approved by the State Agriculture Departments as improved ones for propagation in different regions in the respective States, and for this purpose the State Agriculture Departments should prepare and maintain an up-to-date region-wise and crop-wise list of approved improved varieties. In the sample survey, improved seeds distributed through registered or authorised dealers and institutions and Government agencies should be treated as "improved" and in the case of "natural spread" data should be classified separately under "use up to three/five years" and "use for more than three/five years".

The Working Group on Improved Seeds had suggested that as the yielding propensity of an improved variety declined from generation to generation, the yardstick of additional yield for subsequent years should

be lower than what was expected on first introduction. It was decided that a yardstick should take into account improved seed only, and it should be used for 3 or 5 years or any normal period. There could be salutary rule that after this period the seed would be no more considered improved and it would be removed accordingly.

It was observed that under the scheme of the Directorate of NSS, it was proposed to carry out sample surveys in every State, in each of the major crop seasons, for estimating the area under specified crops benefited by improved seeds, manures and chemical fertilizers, pesticides and other principal improved practices. The Working Group on Improved Seeds on the other hand, required data from three angles, viz. coverage of area by improved seeds and fixation of yardsticks of additional yield owing to improved seeds. It was observed that the estimates of acreage of principal crops under improved seeds could be obtained by the NSS Survey supplemented by the data collected in the course of normal crop-cutting surveys and simple fertilizers trials in cultivators' fields. The estimates of yardsticks for additional yield due to improved practices would have to be obtained from the data collected through trials of improved seed and local seed in cultivators' fields. As the estimates regarding coverage of improved practices at periodical intervals would suffice, the NSS Survey might be conducted once in five years. This quinquennial survey along-with the normal crop-cutting surveys and trial in cultivators' fields would provide the necessary material. There was, however, a need for training the staff doing the crop-cutting surveys and the experimental assistants conducting fertilizer trials in cultivators' fields for the purpose of identification of improved varieties for analysis of the data collected. It was also suggested that for proper coordination of the results obtained from the NSS survey and normal C.C. surveys, the organisations in the States responsible for the latter should be also responsible for the former.

It was considered difficult to obtain any worthwhile data on the extent of purity of improved seeds through these surveys, for which examination of sample of seed in seed testing laboratories was necessary. A suggestion was made that patwaris should be trained to recognise the improved varieties and record the extent of area under them in the Khasra. The general view was that this was not only beyond the capacity of the patwari but would also thrust on him considerable additional work which he would not be able to discharge with his present jurisdiction. It would also create difficulty at the time of preparation of crop-area abstracts at the village level, as the number of column in that abstract would have to be considerably increased. It was also pointed out that with the working of the new scheme for seed certification-cum-seed law enforcement in the Fourth Plan, it might not be necessary to take resort to sample survey for collection of data on the extent of purity of improved seeds. Till then it would be worthwhile for States to collect seed samples from contemporaneous stages of multiplication and from fields coming under seed distributed through various agencies and have them tested for genetical and varietal characteristics at a research station or a seed testing laboratory. Such studies conducted periodically were sure to help in detecting where, when and how contamination had crept in.

A reference was also made to a paper received from Programme Evaluation Organisation on the objective and scope of the survey of levels of employment, consumption and living and use of improved method in

agriculture, etc. proposed to be sponsored by the Planning Commission in each State during 1964-65. The order of priority for this study envisaged (a) analysis of all available data, (b) tabulation and processing of data not fully analysed in the surveys recently conducted, including the NSS ones, and (c) undertaking of additional surveys only on items of recognised importance. The study was designed to obtain estimates in respect of a number of indicators not only in each State but also for regions within each State. As regards the study of the adoption and use of improved methods, it was contemplated to extend the scheme of the NSS study to all the States and to ensure an integrated methodology for this study.

The Group emphasised the need for collection of data on fertilizers and manures for the purpose of proper planning of fertilizer production and consumption and also for assessing periodically the extent of realisation of the set targets of additional production due to fertilizers. It was pointed out that the I.A.R.S. had already conducted surveys in 21 districts which gave data on the extent of utilisation of fertilizers, rate of application etc. A reference was made to the F.A.O. Year Book on Fertilizers which gave most of the information pertaining to other countries, required by the Working Group on Fertilisers. However, the need for collecting data on movement of fertilizers and other fertilizer statistics in the country was recognised and the Group recommended that the Statistical Unit in the Fertiliser Division of the Ministry of Food & Agriculture should be strengthened to enable it to collect such data.

As regards compost manure, it was stated that a Model Scheme was prepared by I.A.R.S. The Group recommended that this scheme should be passed on to the States and they should be enabled to take it up.

The Group also noted the requirements of statistical data of the Working Group on Soil Conservation and Land Reclamation with a view to assessing the benefits of different measures of soil conservation, dry farming and wasteland reclamation. The need for information on increase in yield per acre of principal crops from soil conservation, and land reclamation measures for different agro-climatic regions and for time-spread from one to five years after adoption of the measures, was stressed. Members were informed about the study successfully conducted by Maharashtra Government in respect of contour bunding. The Group appreciated the need for initiating surveys for assessment of benefits of these measures and decided that to gather the necessary technical material for designing such surveys in the Fourth Plan, pilot studies might be initiated, during the Third Plan itself. The IARS was requested to prepare immediately a model scheme for conducting such studies in consultation with the States so that action could be initiated during the Third Five Year Plan itself.

In view of the data on different improved agricultural practices and various items of farm economics already being collected under the IADP surveys and normal crop cutting surveys, it was suggested that they should be analysed regularly to provide some estimates of benefits of improved agricultural practices. These data had an added advantage that they provided estimates of not only spread of improved practices but also some information on the contribution of different combinations of these practices to increased production, as yield data for each sample field are

recorded along with the information on improved practices applied. It was recognised that more accurate data on responses to improved practices singly or in various combinations could be had only from scientifically laid out cultivators' field trials, yet the analysis of the data collected on these practices from the normal crop cutting surveys would provide useful information and, therefore, such data should be collected and analysed regularly.

It was emphasised that the diagnostic studies were different from large-scale estimational surveys inasmuch as the former had their focus on certain problems and issues requiring detailed observation and analysis. The need for such studies was emphasised. The views expressed above regarding estimates of acreage under improved seed and additional production therefrom were found to be in conformity with those of the Working Group on Improved Seeds.

Recommendations

Considering the importance of reliable statistics of area under improved agricultural practices and increase in yield-rates of crops due to them, for formulating and executing measures to step up agricultural production in the country, the Working Group made the following recommendations to obtain the necessary data :

1. The sample survey being conducted under the auspices of the Directorate of National Sample Survey for estimation of area under improved agricultural practices, should be extended to the entire area in each State and to more improved practices, viz., improved seeds, manures and fertilizers (including rural compost and green manuring), dry farming and plant protection measures.
2. As the staff of the State Agriculture Departments would be the ideal agency for the conduct of the survey on improved agricultural practices, the field work could be entrusted to the Progress Assistants, and VLWs, only when the field staff of the Agriculture Department are not available for the purpose. In any case, the Agriculture Department should make necessary arrangements for effective supervision over the field work.
3. As regards the main concepts and definitions and the terms arising in the collection of statistics of improved varieties of crops, the recommendations made by the Technical Working Party set up in the Ministry of Food & Agriculture in 1957, should be implemented. In the sample survey, improved seeds distributed through registered or authorised dealers and institutions and Government agencies should be treated as 'improved', and in the case of "natural spread" data should be classified separately under "in use up to 3/5 years" and "in use for more than 3/5 years".
4. As the estimates regarding coverage of improved practices at periodical intervals; would suffice, the NSS survey might be conducted once in 5 years.

5. Supplemented by the data collected in the course of normal crop cutting surveys and simple fertilizers' trials in cultivators' fields, the NSS survey should be able to provide the estimates of areas of principal crops under *improved seeds*.
6. So far as the estimates of yardsticks for additional yield due to improved seeds are concerned, they could be obtained from the data collected through trials of improved seed and local seed in cultivators' fields.
7. The staff doing the crop-cutting surveys and experimental Assistants conducting fertilizer trials in cultivators' fields should be given adequate training so as to enable them to identify improved varieties and to analyse properly the data collected on them in the various surveys.
8. In order to ensure proper coordination of the results obtained from the NSS surveys on the extent of improved agricultural practices and normal crop-cutting surveys, it would be desirable that the organisations in the States responsible for the latter should also be responsible for the former.
9. In order to enable the Fertilizer Division of the Ministry of Food and Agriculture to collect, compile and analyse the requisite data on fertilizers and manures for purposes of proper planning of fertilizer production and consumption and also for assessing periodically the extent of realisation of the set targets of additional production due to fertilisers, the Statistical Unit of this Division should be suitably strengthened.
10. The model scheme prepared by the IARS for estimation of production of compost and manures should be passed on the States and they should be enabled to take it up.
11. In order to obtain reliable estimates of area under soil conservation, dry farming and land reclamation measures and yield-rates of principal crops due to these measures in different agro-climatic regions and for time spread from 1-5 years after adoption of the measures, the Institute of Agricultural Research Statistics should conduct pilot studies during the Third Plan itself for gathering the necessary technical material for designing such surveys in the Fourth Plan.
12. The data collected on different improved agricultural practices, and various items of farm economics under the IADP surveys and the normal crop cutting surveys should be analysed regularly to provide some estimates of benefits from improved agricultural practices. To enable the Statistical Organisations in the States to complete this analysis expeditiously, they should be suitably strengthened as recommended earlier.
13. Problem-oriented diagnostic studies on improved agricultural practices and land improvement measures should be conducted, as they had their focus on certain problems and issues arising in the course of implementation of programmes which require detailed observation and analysis.

Financial Provision

The following financial provision would be necessary during the Fourth Plan Period to implement the recommendations made above :

- | | |
|---|---------------|
| 1. Sample survey for estimation of areas brought under improved agricultural practices. | Rs. 25 lakhs |
| 2. Strengthening of the Fertilizer Division of the Department of Agriculture in the Ministry of Food and Agriculture. | Rs. 1.5 lakhs |
| 3. Sample survey for estimation of production of compost and manure in rural areas. | Rs. 20 lakhs |
| 4. Sample Survey for estimation of area under and increase in crop-yields from soil conservation and land reclamation measures. | Rs. 25 lakhs |

For initiating the pilot studies during the Third Plan itself to gather the necessary technical material for designing such surveys in the Fourth Plan, a provision of Rs. 1 lakh during 1964-65 or 1965-66 will be needed.

DIAGNOSTIC STUDIES TO RECONCILE THE DIFFERENCES BETWEEN THE STATISTICS COLLECTED BY MORE THAN ONE AGENCY

Summary of the Note Received (DES-5)

There are at present different sets of figures collected by different agencies in respect of area and production of certain crops like cotton, tobacco, tea, coffee and rubber and irrigated areas and areas under forests. The discrepancy between the different sets of figures is often wide. The question of reconciling or narrowing down the differences between the various estimates has been engaging the attention of the Ministry of Food & Agriculture for some time past. The Directorate of Economics & Statistics in the Ministry has undertaken diagnostic studies to find out the causes of discrepancy in the statistics published by the various authorities and to explore ways and means to reconcile them as far as possible. Such studies in respect of cotton, tobacco, tea, coffee, rubber, irrigation and forestry, have been made. The problems with regard to irrigated areas and areas under forests have been examined in the chapters relating to these items. Here the problems relating to cotton, tobacco, tea, coffee and rubber are discussed.

Cotton.—In the case of cotton, the official estimates are generally lower than the trade estimates and the estimates based on mill consumption of cotton and returns of cotton ginned and pressed received from ginning and pressing factories. With the progressive extension of crop-cutting surveys to more areas, the reliability of the official estimates of cotton production has been improving and the difference between the official estimate and trade estimate and estimates based on mill consumption and ginning and pressing data has been narrowing down. The estimates of cotton production based on mill consumption and ginning and pressing returns could also be improved by obtaining more reliable and complete ginning and pressing data and estimates of other factors entering into the formulae based on these data. At present ginning and pressing returns are not complete and systematic, and the estimates regarding extra-factory consumption of cotton, stock held by the trade, extent of inter-state movement of cotton by road are out of date and are not based on scientific enquiries. The trade estimates are subjective in character based as they are, on the impressions of trade agents. The different trade estimates themselves differ to an appreciable extent.

Agreement of official estimate with the trade estimates may be difficult to achieve, but its difference from estimates based on mill consumption and ginning and pressing returns can be substantially narrowed down as measures suggested earlier to improve area statistics are taken, crop-cutting surveys by the random sampling method are extended to the entire cotton growing tract of the country, adequate measures are taken to ensure the quality of the field work, the results of the survey are adopted in forming official estimates of cotton production, correct and complete returns relating to cotton ginned and pressed are received, and the various

factors entering into the estimates based on these returns are objectively estimated.

Tobacco.—In the case of tobacco, the statistics of area are available from two sources, *viz.*, (i) State and (ii) Central Board of Revenue. The data received from State Governments are based on land records prepared on field-wise basis, while the figures of CBR are those collected by the excise staff for the purpose of assessing excise duty on tobacco. In order to examine the nature and sources of the discrepancy between the two sets of figures and to suggest a suitable method of reconciliation, a sample verification of these figures was proposed to be conducted in the two important States of Andhra Pradesh and Bombay during 1955-56 and a scheme was accordingly drawn up by the Directorate of Economics and Statistics and the I.C.A.R. The Indian Central Tobacco Committee recommended that the scheme might be tried initially in one area, *viz.*, Guntur district of Andhra Pradesh and then extended to other area if it was found that there were some valid reasons for the discrepancy. The scheme was operated during 1957-58 in Guntur district, but could be carried out in 34 villages only instead of 100 villages originally planned. This verification revealed that while the figures collected by revenue and excise agencies significantly differed from one another and also from those obtained from the sample check, the former ones were closer to the sample check figures than the 'excise' figures. But in view of the incompleteness of the survey due to late starting of the field work, the Committee recommended that the scheme might be repeated in Kaira district of Gujarat and Farrukhabad district of U.P. in the tobacco season of 1960-61. The survey envisaged under the scheme is reported to have been conducted in Kaira district and the data are being analysed by the Indian Central Tobacco Committee, but it has been deferred in Farrukhabad district due to national emergency.

While the sample check to locate the causes of difference between the area figures reported by the State Governments and the CBR should be conducted in Uttar Pradesh also, efforts should be made to improve the reliability of statistics of area and yield of tobacco reported by the State Governments. Measures for improvement of area figures may be taken in the light of the recommendations made in earlier Chapters and the results of sample checks. For improving yield figures, it is necessary to conduct the crop cutting survey on tobacco crop in all the important States and to base the official estimates of production on the results of this survey. The survey is already in progress in Gujarat, Maharashtra, Andhra Pradesh, Madras, Mysore and Punjab but the results are being utilised in the official estimates in the first two States only.

Tea.—Statistics of area and production of tea are collected by (i) State Governments through their normal revenue agencies and (ii) the Indian Tea Board. Preliminary examination has shown that the discrepancy between the two sets of figures is ascribable to the following factors:

- (i) the number of reporting tea gardens as ascertained by the State Governments and as registered by the Tea Board is not the same;
- (ii) the area under tea as published by the Tea Board relates to registered area comprising planted area and fallow area,

whereas the area reported by the *State Government* relates to the planted area only; and

- (iii) the proforma prescribed by the Tea Board for collection of tea statistics, relates to the financial year, whereas the year adopted by the State Governments refers to the calendar year.

The question of reconciliation of the discrepancy between the two sets of figures was discussed by the Directorate of Economics & Statistics with the representatives of the Tea Board in 1953. It was felt that (a) detailed comparison of lists of tea estates as registered with the Tea Board and as available with the State Governments, and (b) evolution of a common proforma for the collection of statistics both by the Tea Board and the State Governments would go a long way in reconciling the discrepancy. This comparison of the lists of tea estates of State Government and Tea Board was undertaken by the Directorate of Economics & Statistics in respect of Madras, Travancore-Cochin, Assam, Tripura, Uttar Pradesh and Mysore, for which necessary lists according to both the sources were available. It was found that generally there was omission of some estates both by the State Governments and the Tea Board, and, there was discrepancy in the acreages reported by the same estate to the Tea Board and to the State Government. The results were communicated to the Tea Board and the State Governments and they were asked to take necessary steps to see that such discrepancies did not occur.

In consultation with the representatives of Tea Board, a common proforma for collection of tea statistics by both the agencies has also been prepared and accepted by State Governments and Tea Board and a revised procedure for collection of tea statistics has been adopted from 1959-60. Under the revised procedure both the registered and unregistered estates are required to send returns in a common proforma to the Tea Board and the District authorities concerned.

Coffee.—Statistics of area and production of coffee are at present collected by (i) State Governments through their revenue agency and (ii) the Indian Coffee Board. Preliminary discussions with the State Governments and the Indian Coffee Board showed that inspite of the legal obligation of the planters to get themselves registered, a large number of estates still remained unregistered. This was pointed out to the Ministry of Commerce & Industry with the request that the matter of non-registration of estates should be taken up with the State Governments who should see that the penal provisions of the Coffee Market Expansion Act are strictly enforced in order to compel the owners of estates to get themselves registered. The State Governments were also requested to take up detailed scrutiny of the two sets of figures in a few coffee growing areas. A detailed comparison of the two sets of figures in Ammathinad sub-division of the erstwhile Coorg State was undertaken and it was revealed that there were omissions in so far as coverage was concerned both by State Revenue Departments and the Coffee Board. The State Governments of Madras and erstwhile Travancore-Cochin amended their respective Coffee Estate Owners Registration Rules, with a view to collecting some additional information regarding area under coffee.

Now that the procedure for collection of tea statistics has been revised with the twin objective of reconciliation of two sets of figures and ensuring timeliness in the publication of tea statistics, a similar action may be taken in the case of coffee as well.

Rubber.—Estimates of all-India acreage and production of rubber are at present being prepared by the Indian Rubber Board (IRB) and the Directorate of Economics & Statistics and the difference between the two sets of estimates is large.

Under the Rubber (Production & Marketing) Act, 1947, and the rules framed thereunder, all owners of rubber estates, whether big or small, have to get their estates registered in the books of IRB and the total of the areas registered is taken by the Board in the statistics published by them. Any new planting or replanting can be done only through a license from the Board, to whom the area newly planted or replanted during the year has to be intimated. The IRB bases its acreage statistics of particular year by making necessary adjustments for newly planted areas and for abandoned or destroyed areas for which applications are received for cancellation of registration. The area of interplanted rubber and scattered plantings is also included and it is calculated at 150 rubber trees to an acre.

As regards estimates of production all the estates of 50 acres and above are required under the rules to submit returns showing production of rubber during each month. The IRB frames the estimates of production of rubber on the basis of the returns of such estates after making an allowance for the small estates and the estates which do not submit returns regularly.

The estimates of acreage and production framed by the Directorate of Economics & Statistics, on the other hand are based on reports from the State authorities. The difference between the figures published by IRB and Directorate of Economics & Statistics is *prima facie*, ascribable to lack of uniformity in the method of collection and processing of data. The IRB publishes figures for 'tapable area' while the Directorate of Economics & Statistics publishes figures for 'area tapped'. The IRB includes estimates of area for inter-planting and scattered plantings and production estimates for the small and the non-reporting estates. The total number of estates covered by the IRB and the State Government are thus likely to be different.

The State Authorities' figures are revised, if necessary after a comparison with Board's figures at higher levels in some of the States, *e.g.* Madras. In Mysore, the revision and scrutiny is done by the Revenue Inspectors in consultation with estate owners. These corrections are based on individual experience and judgement without any scientific basis.

The problem of reconciliation between the two sets of figures for rubber is similar to that in the case of tea and coffee. The figures could be reconciled to some extent if they relate either to tapable area or tapped area in both the publications, a complete list of rubber estates is prepared and the same proforma is used both by the Board and the State Governments. Small estates may also be brought into the reporting fold. Preliminary examination done so far has revealed the necessity for detailed examination of the causes of discrepancy in order to evolve suitable measures to narrow down the differences. Such detailed studies need to be undertaken under the Fourth Plan.

Summary of Discussion

It was observed that at present there was wide discrepancy between the different sets of figures relating to cotton, tobacco, tea, coffee, rubber and forests and the reconciliation or narrowing down of these differences was very important. It was decided that the Standing Committee on Improvement of Agricultural Statistics set up under the Ministry of Food and Agriculture should look into the various problems involved item by item, and that the Directorate of Economics & Statistics, Ministry of Food and Agriculture should prepare schemes for type studies in one or two selected areas where differences were wide, to diagnose the causes for differences and suggest measures to reconcile them. The type studies might first be started with regard to forest and tea statistics. It was decided that this item should be given high priority and advance action should be initiated during the Third Plan itself. The scheme prepared by the Indian Central Tobacco Committee for reconciling discrepancy in tobacco statistics should be implemented early.

Recommendations

In view of the importance of reconciling the differences between different sets of figures relating to cotton, tobacco, tea, coffee, rubber and forests, the Group recommended the following measures for reconciliation :

1. The Standing Committee on Improvement of Agricultural Statistics set up under the Ministry of Food & Agriculture should examine the various problems involved item by item and the Directorate of Economics & Statistics in that Ministry should formulate schemes for type studies in one or two selected areas to diagnose the causes for differences and suggest measures for reconciliation. The type studies might first be started with regard to forests and tea statistics.
2. The type studies should be given high priority and advance action should be taken during the Third Plan itself, in order that detailed studies could be planned on proper lines during the Fourth Plan.
3. The scheme of the Indian Central Tobacco Committee for reconciling discrepancy in the tobacco statistics should be implemented.

Financial Provision

A sum of Rs. 5 lakhs may be needed during the Fourth Plan for taking the various measures for the reconciliation of the differences between the different sets of figures. For pilot studies during the Third Plan, a provision of Rs. 60,000 may appear necessary during 1964-65 or 1965-66.

STATISTICS OF INTER-STATE MOVEMENT OF FOODGRAINS BY MOTOR VEHICLES

Summary of the Note Received (DES-6)

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Data on inter-State movement of foodgrains by rail and river are collected and published by the Director-General of Commercial Intelligence. With the development of roads and road transport, the inter-State movement of foodgrains by road is also assuming great importance. To obtain a complete picture of the extent of inter-State movement of foodgrains, the data on their movement by motor vehicles and other modes of transport, *e.g.* carts, head-loads, etc. also need to be collected. For the present, however, efforts are being made by the Directorate of Economics & Statistics in the Ministry of Food & Agriculture to organise the collection of data on movement of foodgrains by motor vehicles under the Motor Vehicles (Amendment) Act, 1956, through the motor vehicles operators. The collection of these data involves work at various levels, *viz.*, permit holders, Regional Transport Authority, State Headquarters and the Centre. In order that the data flow smoothly to successive levels, necessary instructions and proformae have been laid down by this Directorate. The permit holders are required to submit periodical returns of foodgrains carried on their vehicles from one State to another, to the Regional Transport Authority. The Regional Transport Authority in turn is required to consolidate the data and submit a fortnightly return to the concerned Department of the State with a copy to the Directorate of Economics & Statistics, Ministry of Food & Agriculture.

The required information under this scheme has to be reported from the point of origin, whereas in the case of rail and river-borne trade, the information is collected at the point of destination. The latter data are compiled on the basis of invoices relating to consignments of selected commodities received at each railway and steamer station from trade blocks, into which States have been grouped. With a view to ensuring uniformity and comparability of the data on inter-State movement of foodgrains by motor vehicles with similar data on inland (rail and river-borne) trade, foodgrains have been divided into 12 groups, *z* rice in husk, rice not in husk, jowar, bajra, maize, ragi, other millets, wheat, wheat-flour, barley, 'gram and gram products', and 'pulses other than gram and gram products'.

When the scheme of the Ministry of Food & Agriculture was formulated and circulated to the States in June, 1960, it was contemplated that the data would be collected through motor vehicle operators under section 56(2) (vi) of the Motor Vehicles (Amendment) Act, 1956. It was presumed that the powers under this Section were exercisable by the Transport Departments of the States and that the returns would be obtained from the motor vehicle operators as a condition of the license issued to the permit holders by the Regional Transport Authority acting on behalf of the Transport Department. It was also felt that this Authority would be in a position to check up during the given period if all the permit

holders licensed have furnished the returns and to call for outstanding returns from the defaulters on pains of cancelling the licence. Financial assistance for the appointment of one or two non-gazetted staff at the regional State level was also offered to the States in August, 1961 to remove initial hurdles in the implementation of the scheme.

While some States have adopted the procedure and proformae suggested by the Directorate of Economics & Statistics, some other States have formulated schemes on different lines, keeping in view their administrative convenience.

The States of Assam, Maharashtra, Mysore, Orissa, Rajasthan and West Bengal have more or less adopted the procedure suggested by the Directorate of Economics & Statistics. Maharashtra and Rajasthan have taken up the scheme on State-wide basis while Madhya Pradesh and Orissa have taken it up in one district each. West Bengal has recently decided to try the scheme on a pilot basis.

Bihar has adopted the procedure suggested by the Directorate of Economics & Statistics, but they propose to collect the information in the proformae devised by the Union Ministry of Transport with necessary modification to ensure inclusion of all items on which information is wanted by the Ministry of Food & Agriculture.

Punjab has adopted a slightly different procedure than what is suggested by the Directorate of Economics & Statistics. The required data are being collected through Commission Agents and Mill Owners. The Commission Agents are required to get licences from the State Director of Food and Civil Supplies and to submit fortnightly returns for rice and wheat under the Essential Commodities Act. The mills engaged in the manufacture and export of flour, maida and other products of foodgrains are also required to submit monthly returns to Government about the quantities exported from the State. It is understood that the rules can be amended requiring the Mills to submit the returns also in respect of other commodities exported by them. It has also been ascertained from the State Government that the entire export of wheat, rice and their products and other commodities listed in the scheme, is carried out by the Commission Agents and Mill Owners. They have also been requested to ensure occasional checks on the returns received from mill owners and commission agents.

Andhra Pradesh, Gujarat and Kerala have shown their preference for collection of data at the check-posts themselves. Their schemes envisage establishment of some new check-posts also involving huge expenditure. The Madras Government propose to use the Collection of Statistics Act, 1953 for collecting the required data which would cover other modes of transport as well. It has been suggested that their scheme should enable collection of data separately for movement by motor vehicles and that it should furnish data for all foodgrains. Final decision of the State Government is awaited.

No exports are reported from Jammu & Kashmir to other States. The data about imports in Jammu & Kashmir would be available from the returns of other States specially Punjab. As regards other States, the scheme is still under consideration.

The Ministry of Transport has also formulated a scheme with a view to estimating the haulage of goods by motor transport, for a proper appreciation of its role in India's growing economy. This Ministry approached the State Governments in October, 1960 for framing rules regarding maintenance of Way Bill Records by Public Carriers. The scheme has since been finalised. An examination of the proforma adopted under this scheme shows that it is essentially the same as the proforma for the Log Book suggested by the Directorate of Economics & Statistics, and it further provides for collection of additional information, *viz.*, (i) miles, *i.e.*, distance between origin and destination, (ii) maund-miles performed, and (iii) freight charged. The list of items in the Transport Ministry scheme has, however, all-foodgrains as one item, whereas the E & S Directorate scheme lists the various foodgrains separately. The different stages and the procedures of collection and compilation of the data laid down in the Transport Ministry scheme are, however, not known.

To sum up, while some States have agreed to collect and furnish the data on inter-State movement of foodgrains by motor vehicles through the vehicle operators under the provisions of the Motor Vehicles (Amendment) Act, 1956 as laid down by the Directorate of Economics & Statistics, Ministry of Food & Agriculture, some others envisage the collection of the required data through the agency of *ad-hoc* staff posted at the border check-posts and to establish a few more check-posts to complete the coverage. Still some other States propose to collect the data under Collection of Statistics Act, 1953, or Essential Commodities Act for Sales Tax Act. The proformae and their content also differ from one group of States to another. In view of the importance of these data for purposes of food policy and administration, it is necessary to organise their collection in the different States on a comparable basis. The provisions of the various Acts need to be examined in consultation with the State Governments to see (i) as to which Act would give the largest volume of information with or without certain amendments in it and in the rules framed thereunder, (ii) whether one Act could be applied uniformly over a given region if not all over the country and (iii) when different Acts are applied in different regions or States what procedures have to be adopted to secure comparability of data. Besides statutory provisions, the feasibility of some other procedure for obtaining the data could also be examined. For these studies and for coordination and guidance of the work in different States and tabulation of the data, some staff at the Centre appears necessary. States may also need financial assistance on a more liberal scale to cross the initial hurdles. From these considerations, it appear necessary to continue it as a plan scheme under the Fourth Plan.

Summary of Discussion

It was explained that the objective of the scheme in operation was primarily to obtain for the use of the Food Department certain basic data on inter-State movement of foodgrains by road. It was pointed out by the representative from CSO that the Goods Traffic Survey of the Ministry of Transport could perhaps meet the requirements of the Food Department. CSO was requested to prepare a note on the survey of the Transport Ministry and the manner in which it would meet the needs of the Food Department. Though the required note from the CSO was not received, it was felt that the scheme of the Ministry of Transport

might not meet the requirements of the Ministry of Food and Agriculture as it did not show a break-up among individual cereals.

The Group was further informed that the response from the States with regard to the implementation of the scheme of the Ministry of Food & Agriculture was not very encouraging, even though 100% financial assistance from the Centre had been offered. In view of the poor response from the States in spite of the importance of the present scheme, it was suggested that the Directorate of Economics & Statistics might also look into the details of the ISI-N.S.S. Goods Traffic Survey and the Survey of the Transport Ministry and examine how far the data envisaged under the scheme of the Ministry of Food & Agriculture could be obtained from these surveys.

Recommendations

1. The Directorate of Economics & Statistics in the Ministry of Food & Agriculture may continue their efforts to obtain from the States the Statistics of inter-State movement of foodgrains by motor vehicles under the existing legal provisions.
2. The Directorate of Economics and statistics might also look into the details of the ISI-N.S.S. Goods Traffic Survey and the Survey of the Transport Ministry and examine how far the data envisaged under their scheme could be obtained from these surveys. Should it be found necessary to launch a separate survey, the details thereof might be settled in consultation with the Department of Statistics & Ministry of Transport.

Financial Provision

A provision of Rs. 8 lakhs was considered necessary during the Fourth Five Year Plan for collection of Statistics of inter-State movement of foodgrains by motor vehicles.

CHAPTER X

IMPROVEMENT OF PRICE INTELLIGENCE

Summary of the Note Received (DES-7)

The term 'Price Intelligence' relates to information on prices, production, marketable surplus, arrivals, despatches, stocks, market sentiments, etc., which is useful in the interpretation of market behaviour. Price intelligence together with other agricultural economic intelligence can serve as a useful instrument for developing suitable price policy, for implementing successfully the country's production programmes and for ensuring an even flow of market supplies over time and space. The market information, when disseminated, also aids the producers in the marketing of their produce and in providing answers to questions as to when, where and how much to sell.

At present some work is being done in the States in the matter of collection and publication of market intelligence relating to agricultural commodities. However, the agencies through which this work is being done and the content of information being collected are not uniform all over the country and much needs to be done. For policy and planning purposes, data are now needed not only on wholesale prices but also on many other items of price intelligence. With a view to improving both the quality and content of price intelligence, a Scheme for Improvement of Market Intelligence was initiated in the Second Five Year Plan for implementation by the State Governments. The main objects of the Scheme which is being continued in the Third Plan, are to effect immediate improvements in market news service, and long-term improvements in price intelligence work. The scheme envisages improvement of the existing market news service by rationalising the scope and content of the market news bulletins broadcast in Rural Programme from the Regional Stations of All-India Radio and distributed to village organisations for dissemination to cultivators and by extending the installation of notice boards in other markets for display of market intelligence. It seeks to effect long-term improvements in price intelligence by setting up a whole-time reporting agency in all the important markets and also by setting up the requisite type of supervisory agencies. Besides, the State Governments have also to bring out regular bulletins on price intelligence.

During the Third Five Year Plan all the States and Union Territories have taken steps to implement the scheme and have, in the process, appointed whole-time reporting agencies at about 450 markets. The Directorate of Economics and Statistics in the Ministry of Food and & Agriculture has also established 8 regional offices to ensure compliance of the provisions of the Scheme by the State Governments.

As the Agricultural Production Team sponsored by the Ford Foundation has observed, data on demand in different markets and on production potential in producing areas are required for preparing realistic plans for increased food production. In addition to the present work of collecting and publishing some market information for agricultural commodities, a more comprehensive scheme is needed for obtaining and

analysing the various market intelligence. Besides collecting data at market level, steps also need to be taken to make up the deficiency in the data collected at the village level. In India there are about 3,600 regular markets held daily besides about 22,000 periodical markets held bi-weekly, weekly or fortnightly in rural areas. For a proper appraisal of food and agricultural situation obtaining in different parts of the country it would be desirable to cover under the Price Intelligence Scheme as many of the 3,600 regular markets held daily as possible and also some of the important periodical markets held bi-weekly, weekly or fortnightly. Steps also need to be taken for initiating the reporting of intelligence at the village level. The market intelligence collected may also have to be displayed graphically, and tabulated and analysed quickly through electro-mechanical devices so as to highlight in time the main indicators for assisting Government in making and executing price policies.

The large volume of information that will be collected and displayed, will have to be quickly and carefully analysed on a scientific basis and correlated with one another so as to provide an effective basis for top operational decisions by the Government. A Price Intelligence Division has been set up in the Directorate of Economics & Statistics, Union Ministry of Food and Agriculture, which is mainly concerned with (i) collection and analysis of price intelligence and other agricultural economic intelligence, (ii) display of intelligence, (iii) stimulation of operational research, and (iv) advising the Ministry of Food and Agriculture on matters relating to formulation, execution and review of price policy. The Division has made a beginning with the collection of data on price intelligence and advising the Ministry of Food & Agriculture. In the Fourth Plan steps will have to be taken to extend the activities to the remaining items of work. It may also be necessary to set up similar organisations in the States so that suitable remedial action can be taken expeditiously.

The scope of market news service will also have to be extended gradually so as to increase the number of markets and commodities in respect of which market news is disseminated by All-India Radio and through other media and also to collect other data for preparing reports on crop outlook. It will also be necessary to initiate a programme to install and maintain a radio set in every village in India for dissemination of market reviews by All-India Radio. The Directorate of Economics & Statistics may also have to organise the training of the supervisory officers of the State Governments who, in their turn, will impart training to the primary reporters.

Thus in the Fourth Five Year Plan financial provision will have to be made for the following items of work by the Central and State Governments :

Central Government—

Strengthening of Price Intelligence Division of the Directorate of Economics & Statistics, Ministry of Food & Agriculture, so that it can develop into an Agricultural Economic Intelligence Organisation;

Mechanical and other equipment necessary for the quick processing, analysis and display of intelligence; and

Organisation of training of supervisory officers and primary reporting agencies of the State Government.

State Governments—

Appointment of technical reporting agencies in the markets according to a phased programme. It is proposed to appoint about 500 whole-time reporting agencies;

Appointment of Supervisory staff. Each State may be divided into a few zones and each zone given a supervisory officer with his headquarters in the zone itself;

Training of supervisory officers and primary reporting agencies. Establishment/Strengthening of Price Intelligence Organisations at State headquarters;

Estimation of Farm Disposal. To frame estimates of farm disposal of important crops, investigators will have to be appointed in important assembling markets of each State; and

Amendment of basic forms and their printing. In order to make the records of regulated market committees more useful, it will be necessary to amend the basic forms so as to provide collection of more comprehensive and reliable information.

Summary of Discussion

It was explained that the Scheme for Improvement of Price Intelligence under the Fourth Five Year Plan envisaged strengthening of the price intelligence organisation in the States to enable proper collection, presentation, analysis and interpretation of the price intelligence. The State Governments would appoint whole-time reporters in 500 markets for collection of prices intelligence covering wholesale prices, market arrivals, trade stocks, market sentiment, market behaviour, etc. The State Governments would also make necessary arrangements for the collection of data on market arrivals, trade stocks and wholesale prices in another set of 400 wholesale markets with the help of the Government agencies available there. Supervisory Officers in different zones of each State would also be appointed to supervise the work of reporting market intelligence and to assess the food and agricultural situation. The State Governments would further undertake special studies on marketed surplus and the farmers' propensity for stock holdings and disposal.

The need for strengthening the Directorate of Economics & Statistics in the Ministry of Food & Agriculture was also emphasised so as to enable coordination of the work done by the States, organisation of proper dissemination of market intelligence, assessment of crop and food outlook and training of the supervisory officers of the State Governments. It was emphasised that the scope of the scheme for price intelligence should be extended to cover the entire range of prices of agricultural commodities, from prices received by farmers to prices paid by the consumer and that the agencies to be developed under the scheme should be utilised for the purpose. The Group was informed that on the advice of the Ministry of Food & Agriculture the Price Intelligence Authority in Rajasthan had started collection of data on farm (harvest) prices from selected villages in the hinterland of certain markets through the market reporters appointed under the Scheme for improvement of Price Intelligence and that the experiment was successful.

Some members wanted to know if the scope of the present scheme could be curtailed, as data on retail prices were already being collected

from 400 villages during the regular NSS rounds. It was explained that the price data collected from these centres related to rural prices only and were inadequate for the purpose of the Ministry of Food & Agriculture. The members thereupon wanted to know the uses to which the price data collected by the Directorate were being put to. It was explained that information on wholesale and retail prices and other market intelligence was received in the concerned departments of the State Governments and in the Directorate of Economics & Statistics. In the Directorate, daily wholesale prices were collected from about 160 markets which had been selected in such a way as to include primary, secondary and terminal markets. Daily retail prices were also received from about 80 markets. In addition, weekly wholesale prices were received from 470 markets and weekly retail prices from about 110 markets. Information on market arrivals and trade stocks was received in respect of about 1,000 markets. Price data and other market intelligence thus collected, were processed and analysed in the Directorate of Economics & Statistics for advising the Ministry of Food & Agriculture in its day-to-day work. The wholesale prices were also utilised for the construction of index numbers of wholesale prices by the Economic Adviser, Ministry of Industry. The information on market arrivals was utilised in the estimation of marketed surplus of important agricultural commodities and in analysing and in interpreting the price behaviour so that remedial or corrective action could be initiated promptly, in areas where such action was needed. The State Government utilised data on prices for construction of a series of index numbers. The price and other market intelligence was presented by the Directorate in a number of weekly, monthly and annual publications for the use of the various State and Central Government Departments and other institutions. Prices in respect of over 370 markets were disseminated daily through broadcast from the regional stations of All-India Radio. Weekly market review of the price position in respect of about 450 markets was also broadcast through the regional stations of All-India Radio.

After a prolonged discussion it was decided that while the Directorate of Economics & Statistics should expand the scope of their scheme to cover the collection of statistics of prices at all stages including rural retail prices, they might also explore whether the NSS rural retail price data could be utilised.

As regards costs, it was observed that almost all the wholesale markets would get regulated by the end of the Fourth Plan period and hence expenditure on appointment of whole-time reporting agency would get reduced. It was explained that the whole-time reporting agency was also expected to make a study of the market conditions on the basis of data on market arrivals, local demand and supply situation, crop outlook, market sentiments, etc., and send their observations to the Directorate of Economics & Statistics as well as to the respective State Governments. The process of regulating markets under the Agricultural Produce Markets Acts was likely to take some time. The main duty of the Superintendents or Secretaries of the regulated markets was to enforce provisions of the Agricultural Produce Markets Acts and to supervise collection of the market cess. They might supervise maintenance and supply of basic data on prices and market arrivals but they might not be in a position to properly assess the market conditions and supply to the Central and State Governments regular reports on the factors influencing prices, market arrivals, trade-stocks, etc. They would also not be able to supply information on

retail prices, harvest prices, wholesale prices of non-regulated agricultural commodities, despatches to out-station markets, etc. It might, therefore, be necessary to maintain whole-time price reporting agencies at some of the important markets even after regulation.

Recommendation

Considering the importance of comprehensive market intelligence in formulating and executing the agricultural production and price policies, the Group recommended the strengthening of the Price Intelligence Division of the Directorate of Economics & Statistics in the Ministry of Food and Agriculture and counterpart organisations in the States, appointment of whole-time reporters in selected markets and supervisory officers in different zones in each State, improvement of the reporting system in other markets, organisation of suitable programmes for the training of the supervisory and reporting agencies in the States, wider dissemination of market news through the All-India Radio and quick mechanical tabulation and display of the market information collected.

Financial Provision

Adequate financial provision will have to be made for the different items. Besides, provision will also have to be made for meeting incidental expenses on account of postal and telegraphic charges, printing, stationery, etc.

It was estimated that so far as the State Governments were concerned, the total cost would work out to Rs. 152 lakhs for the Fourth Five Year Plan. Of this amount, Rs. 72 lakhs will be spent on meeting the salary and establishment charges of reporting agencies and supervisory staff, Rs. 5 lakhs on training, Rs. 50 lakhs on establishment and strengthening of the Price Intelligence Organisations in the States (including expenses on postal and telegraphic charges, printing, stationery, etc.), Rs. 15 lakhs for organising the work for estimation of marketed surplus and Rs. 10 lakhs for amending basic forms used by regulated market committees, and their printing. Some reduction in this cost was anticipated as more and more wholesale markets would be regulated.

The cost of the scheme at the Centre during the Fourth Five Year Plan period was estimated at Rs. 45 lakhs.

Advance action with regard to the training of the reporting and supervisory staff of the States was considered necessary to lay the foundation for taking up the scheme under the Fourth Plan. A provision of Rs. 1 lakh during 1964-65 or 1965-66 was suggested.

CHAPTER XI

INDEX NUMBERS RELATING TO AGRICULTURAL ECONOMY

Summary of the Note Received (DES-8)

For a study of the trend in the various aspects of agricultural economy over time and for inter-State comparison of the progress of programmes for agricultural development, the following All-India, State and Regional index numbers relating to the agricultural economy are being compiled by the various organisations :

**Index Numbers prepared by the Directorate of Economics & Statistics,
Ministry of Food and Agriculture**

All-India Series—

Index Numbers of Agriculture Production	Published
Index Numbers of Area under Crops	„
Index Numbers of Agricultural Productivity	„
Index Numbers of Farm (Harvest) Prices	„
Index Numbers of Wholesale Prices of Rice and Wheat	Unpublished

State Series—

Index Numbers of Wholesale Prices of Rice and Wheat	Unpublished
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Regional or Central Series constructed under the Scheme for Compilation of indicators in the sphere of Agriculture—

Index Numbers of Wages of Field Labourers	Unpublished
Index Numbers of Farm Prices	„
Index Numbers of Prices received	„
Index Numbers of Farm Cost	„
Index Numbers of Cost of Cultivation—Major Crops	„
Index Numbers of Cost of Production—Major Crops	„
Index Numbers of Gross Value of Farm Production	„
Index Numbers of Quantities Marketed—Major Crops	„
Index Numbers of Stocks	„
Index Numbers of Farm Employment	„
Index Numbers of Non-Farm Employment	„
Index Numbers of Total Employment	„

Index Numbers Compiled by the Labour Bureau, Ministry of Labour and Employment—

All-India Consumer Price Index Numbers for Agricultural Labourers (Interim Series)	Unpublished
State Consumer Price Index Numbers for Agricultural Labourers (Interim Series)	Published

Index Numbers Compiled by the State Governments—

Index Numbers of Agricultural Production	Published
Index Numbers of Area under Crops	"
Index Numbers of Agricultural Productivity	"
Index Numbers of Farm (Harvest) Prices	"
Index Numbers of Agricultural Wholesale Prices	"
Index Numbers of Agricultural Wages	"
Index Numbers of Parity between Prices received and Prices paid by the Farmers	"

The present position with regard to these index numbers is summarised in the following paragraphs.

Index Numbers of Agricultural Production

The first series of index numbers of agricultural production in India was compiled in the year 1949, with the quinquennium ending 1939 as the base, the coverage being limited to 19 principal crops for which reliable estimates of production were then available. As the production estimates for more crops became available, the series was reconstructed in 1954 with the agricultural year 1949-50 as the base and the coverage extending to 28 principal crops divided into two main groups and six sub-groups, namely, (a) Foodgrains—(i) Cereals: Rice, Jowar, Bajra, Maize, Ragi, Wheat, Barley and Small Millets; (ii) Pulses: Gram, Tur and other Pulses; and (b) Non-Foodgrains—(i) Oilseeds: Groundnut, Sesamum, Rape & Mustard, Linseed and Castor-seed; (ii) Fibres: Cotton, Jute and Mesta; (iii) Plantation crops: Tea, Coffee and Rubber; (iv) Miscellaneous crops: Sugarcane, Pepper, Tobacco, Potato, Ginger and Chillies.

The year 1949-50 was chosen as the base as it was considered to be a relatively normal year from the point of view of both agricultural production, especially food production and price level particularly in respect of agricultural commodities. For this year, the official estimates of production of foodgrains were also close to the crop-cutting survey estimates and were thus comparatively free from bias of under-estimation. The question of change of the base period to a more recent period is under consideration.

To provide for changes in the estimates of production due to extension in geographical coverage and variation in the method of estimation, these index numbers are constructed by the chain base method, in which the production of a crop during a year is expressed as a relative with the corresponding production in the preceding year and this production relative is linked to the production in the base year through the intervening

chain relatives. The weighted arithmetic averages of the production relatives of the individual crops are taken to represent the sub-group, the group and the all-commodity index numbers. The weights are assigned to the different commodities in proportion to the value of their production in the base year, evaluated at the average farm (harvest) prices.

The application of chain-base method involves two basic assumptions, *viz.*, (i) the variation in production in the non-reporting areas is the same as that in the reporting areas in the aggregate; and (ii) the relative variation in the figures of production based on crop-estimation surveys is the same as that based on the traditional method of crop estimation employing eye-appraisal and normal yield figures. The practical implications of (ii) are that for the transitional year, when the method of estimation undergoes a change, the estimates of production should be available on the basis of traditional method as well as crop-estimation surveys. In certain cases where these are not available, some adjustments are made, as far as possible, to make the data comparable.

The concept of production utilised in the series is essentially that of gross production, no allowances being made for seed, feed and wastage. The FAO series of index numbers of agricultural production are also essentially based on gross output, although quantities of crops, milk and skimmed milk used as animal feed, are deducted to avoid double counting which would occur if foodgrains credited to food crops production are fed to livestock and the resultant livestock products are included in the Index. But as the index numbers of agricultural production in India do not cover livestock products for want of reliable production estimates, such allowances are not necessary and they are not made.

Considering the importance of similar indices at the State level for appraisal of trends in their agricultural production the States were requested in 1955 to undertake construction of index numbers of their agricultural production on the lines of the all-India series. Besides Uttar Pradesh which was already constructing this index with 1948-49 as the base, Andhra Pradesh, Assam, Bihar, Gujarat, Kerala, Madhya Pradesh, Madras, Maharashtra, Mysore, Punjab, Rajasthan and West Bengal also started their series. They followed essentially the same concepts and definitions and methodology as was adopted in the all-India series, yet there were and still are a few variations with regard to the base, coverage and group and sub-group classification of crops. These variations are discussed in the following paragraphs.

Base Period.—The States of Andhra Pradesh, Assam, Bihar, Gujarat, Maharashtra, Punjab and West Bengal adopted in conformity with the all-India series, the agricultural year 1949-50 as the base, while the base adopted was the agricultural year 1952-53 in Kerala, Madhya Pradesh and Mysore, the triennium ending with 1949-50 in Madras and the quadrennium ending with 1955-56 in Rajasthan. The choice of a different base by the States from that of the all-India series was guided either by the lack of basic data for the year 1949-50 or the abnormality of that year from the point of view of agricultural production in the States. The series of index numbers in U.P. continued with the year 1948-49 as the base.

The question of adoption of a suitable base for the State series of index numbers of agricultural production was, *inter-alia*, discussed during

the Ninth Conference of Central and State Statisticians held at Jaipur in December, 1960. The Conference recommended the selection of a post-States Re-organisation year as the base so as to avoid inaccuracies that might have entered in the statistics of production of crops of individual States for the earlier years as a result of this reorganisation. It was further desired that the base year should be, as far as possible, normal from the point of view of agricultural production and prices and should preferably be a land-mark in the planning stages such as the base or the beginning of a Plan. In the light of these considerations the agricultural year 1956-57 was recommended as the base, and all the States except Rajasthan, Orissa, Uttar Pradesh and West Bengal have constructed their revised series of index numbers with this year as the base. Rajasthan and Uttar Pradesh still continue their series with the old base. Orissa has adopted 1952-53 as the base as 1956-57 is considered to be an abnormal year in that State. Jammu and Kashmir is expected to construct its series with 1956-57 as the base in the near future, while the Union Territories are still in the process of finalising their series or revising their old series.

Method of Construction and Weighting Diagram.—The Conference also emphasised the need for uniformity in concepts, definitions, base period, etc. in the State series so as to obtain a proper appraisal of the progress in the field of agriculture in the different States on a comparable basis. Accordingly, a note laying down broad criteria governing the selection of crops for inclusion in the index, method of construction, weighting diagram, etc., with prepared in the Ministry of Food and Agriculture in consultation with the Central Statistical Organisation and sent to the States in June, 1961 for their guidance. However, some State series still differ from the all-India series not only with regard to the base period as already discussed, but also with regard to method of construction, crop coverage, and nature of prices used for evaluating the production, for the purpose of weighting diagram. While most States follow the chain base method for the construction of the index numbers, Gujarat and Uttar Pradesh adopt the fixed base method. In U.P., the prices used for evaluation of production for the purpose of weighting diagram are the wholesale prices prevailing during the harvest season, and not the farm (harvest) prices as employed in the all-India and other State series.

Coverage and Classification of Crops.—Some of the crops covered by the all-India series are not included in the series of individual States chiefly because of their lack of importance in the States concerned. Similarly certain crops not included in the all-India series, are included in the individual State series because of their importance in these States. The area accounted for by the crops included in the State series is more than 90% of the gross cropped area in all the States except Orissa, Punjab and Rajasthan where the coverage is limited to 70 to 80% of the cropped area mainly due to non-availability of reliable production data for the excluded crops.

There are some variations between all-India and State series with regard to grouping of crops also. In U.P., group indices are constructed for "food crops" and "cash crops", whereas in the all-India series as well as in other States series the group indices are constructed for 'foodgrains' and 'non-foodgrains'. The States of Andhra Pradesh, Madras and U.P. compile the index numbers for individual crops under the sub-group

'small millets', but not for the group as a whole. *Coconut is generally included in the 'oilseeds' group and it has been so included in Kerala and Madras, but in Mysore it is included under the 'miscellaneous' sub-group. In U.P., gram has been included under the 'cereals' sub-group and not in the 'pulses' sub-group as has been done in the case of all-India series and other State series.*

Index Numbers of Area under Crops and Agricultural Productivity

In addition to index numbers of agricultural production, the index numbers of area under crops and agricultural productivity are necessary for a comparative study of trends in acreage and agricultural productivity over time. These index numbers for all-India have accordingly been compiled by the Directorate of Economics & Statistics, Ministry of Food & Agriculture with the same base and crop-coverage as adopted for the index numbers of agricultural production. Further, like production index, the area index has been computed on the chain-base method to allow for changes in coverage and method of estimation of area. For each crop, the all-India acreage during the year has been expressed as a relative with the corresponding area under the crop in the preceding year, based on the same coverage and method of estimation. These relatives for each crop have been linked to the base year through the intervening chain relatives to give the area index for the crop. The sub-group, the group and the all-crop index numbers have been calculated directly from the total area under the sub-group, group and all crops.

The index numbers of area under the principal crops are based on the Revised Estimates issued in the "Crop Estimates" from time to time. However, since these estimates become available with a time-lag of more than a year, the index numbers for the latest two years are based on the 'Final' and 'Partially Revised Estimates'.

The index number of agricultural production divided by the index number of area gives more or less a measure of gross agricultural productivity. To obtain an index number of productivity, it may be necessary to base the index number of area on 'net' area sown and not on 'gross' area. But, as 'net' areas under individual crops are not available, the index of gross productivity has been worked out from 'gross areas'.

Following the methodology of the all-India indices of area under crops and agricultural productivity, Andhra Pradesh, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Mysore and Punjab are also constructing similar State indices with 1956-57 as the base and covering the same crops as included under the index numbers of production.

Index Numbers of (Farm) Harvest Prices of Principal Crops

The base period adopted for the all-India series of index numbers of farm (harvest) prices is the agricultural year 1938-39 and it covers 15 crops divided into three groups, viz., (a) Foodgrains—Rice, Jowar, Bajra, Maize, Wheat, Barley and Gram; (b) Oilseeds—Groundnut, Sesamum, Rape and Mustard and Linseed; and (c) Miscellaneous—Sugar (raw), Tobacco, Cotton and Jute. The areas under these 15 crops account for roughly three-fourth of the total cropped area in the States covered and over one-half of the total cropped area in the country. Other important crops such as pulses other than gram, plantation crops, spices etc. are not

included because of non-availability of prices and other relevant data for the base year. The States covered are the former Part 'A' States of Andhra, Assam, Bihar, Bombay, Madhya Pradesh, Madras, Orissa, Punjab, Uttar Pradesh and West Bengal and the former Part 'C' State of Delhi. The total geographical area of these States forms about 60 per cent of the total geographical area of the country.

The price data forming the basis of this index are 'harvest season prices' reported by the branches of the State Bank of India. For each crop, important marketing centres have been selected, and for each centre, weekly wholesale prices during the prescribed harvest period of 6–8 weeks are reported by the concerned branches of the State Bank of India. A simple average of the weekly quotations is taken to represent the "harvest season price" for that commodity at that centre. This 'harvest season price' is, however, different from the 'farm (harvest) price' which is defined as the average wholesale price at which the commodity is disposed of by the producer at the village site, during the specified harvesting period and which is collected every week from a number of villages, selected on a purposive basis, during the specified harvest period of six to eight weeks. Simple average of the weekly village prices is taken to obtain average district prices and the State price is the weighted average of the district prices with the production of the crop in the districts as weights. Since the farm (harvest) prices are now being reported by most of the States, their utilisation in place of the 'harvest season prices' is under consideration.

Chain base method is used in the construction of this index in view of the fact that price quotations are not uniformly available throughout the period. The current year's price relatives are computed in relation to the previous year and are linked with the base year through the intermediate years. For each year, the price relative for each variety of a crop at each centre is computed in relation to the corresponding price for the previous year. A simple geometric average of variety-wise price relatives gives the price relative of a crop at a centre. A simple geometric average of centre-wise price relatives gives the single price relative for the State for a crop. The price relatives for the different States are combined into the all-India commodity price relative taking their weighted geometric mean, the current year's production in the different States covered being used as weights. After compiling the price indices for each year relative to the previous year, these are linked through the successive intermediate years with the base year to get the index numbers for each of the crops. The weighted arithmetic mean of the index numbers for the individual crops with the average value of their production during the three years ending 1938-39 as weight, give the all-India index numbers of harvest prices for 'Groups' and 'All-Crops'. Hitherto the type of average used for combining crop-wise indices into 'Groups' and 'All-Commodities' indices was weighted geometric mean. This has now been changed to weighted arithmetic mean in line with other current series of index numbers relating to agricultural production, wholesale prices, etc.

It will be seen that a system of double weighting is adopted in working out this series. In the first instance, to work out a commodity index, moving weights are used for combining the price relatives for different States into the commodity price relative taking their weighted geometric mean, the current year's production in the different States covered being used as

weights. Subsequently, to work out all-commodity index, weights are assigned to the different crops in proportion to the average values of their production in the States covered, during the three years ending with the base year.

As regards the States, only Madhya Pradesh has been compiling the index numbers of its harvest prices with 1952-53 as the base. The series covers 22 principal crops divided into two main groups, *viz.* foodgrains and non-foodgrains and four sub-groups, *viz.* cereals, pulses, oil-seeds and miscellaneous crops. The farm (harvest) prices utilised in the construction of this series are according to the new connotation in respect of Mahakoshal region and according to the old connotation up to 1956-57 and new connotation thereafter in respect of Madhya Bharat, Vindhya Pradesh and Bhopal regions. According to the new connotation, the farm (harvest) price is defined as the average wholesale price at which a commodity is disposed of by the producer at the village site during its specified harvesting period. In each district the weekly farm prices of the principal crop are collected from 10 representative village markets for all the weeks of its harvesting season and a simple average pooled over all the centres and all the weeks in the season gives the district average farm price for the year. According to old connotation the district farm (harvest) price is the wholesale price ruling at the district headquarters market on the last day of February in the case of kharif crops and on the last day of May in the case of rabi crops. The State farm (harvest) price of a commodity is the weighted average of all the available district farm (harvest) prices, the weights being its total production in the districts. The average farm price of each commodity for the State as a whole for any year is expressed as a price relative of the corresponding price with preceding year. The price relative thus worked out is linked to the price in the base year through the intervening chain relatives to give the price index for that crop. The weighted arithmetic average of such price indices of different commodities is taken to give the index numbers for sub-groups and groups and all commodities, weights being assigned to the different commodities in proportion to the total value of their production in the base year, the production itself being evaluated at the State average farm price.

Index Numbers of Wholesale Prices of Agricultural Commodities

The index numbers at all-India and State level of wholesale prices of rice and wheat are compiled on a weekly basis by the Directorate of Economics and Statistics. The agricultural year 1955-56, the last year of the First Five Year Plan, is taken as the base, as in that year the level of agricultural price was more or less normal, and the availability of the price data was also quite satisfactory. Price quotations from 95 representative markets are utilised in respect of rice and from 43 representative markets in respect of wheat. Average annual price for each market for the base year is computed by taking the arithmetic mean of the weekly wholesale prices for all the weeks during the base year. For each selected market price relatives are computed every week by taking the average wholesale price of the commodity in the base year as 100. A simple arithmetic average of the price relatives for all the markets gives the index number of wholesale price for the commodity for the State. All-India index numbers are computed as weighted arithmetic mean of the State index numbers, weights being proportional to the volume of marketable surplus of the commodity in each State.

The States of Bihar, Kerala, Mysore, Punjab and Uttar Pradesh are also compiling index numbers of wholesale prices of agricultural commodities.

The base adopted is the agricultural year 1952-53 in Bihar and Kerala, the financial year 1952-53 in Mysore and Punjab and the agricultural year 1957-58 in Uttar Pradesh.

The commodities included in the index vary from State to State depending upon the importance of individual commodities in the different States. Besides important cereals, pulses, oilseeds, fibres and other miscellaneous crops, some States have included other agricultural products and industrial raw materials. The commodities included account for about 90% of the cropped area and about 80% of the produce marketed in Mysore and about 87% of the annual value of the total agricultural production in Punjab.

In Bihar, Mysore, Punjab and Uttar Pradesh the weekly prices utilised in the index are the wholesale prices as prevailing on Friday. In Kerala, on the other hand, month-end wholesale prices are used. In Mysore, the prices are exclusive of sales tax, market and transportation charges while in Punjab the *mandi* auction prices as on Friday of the week are used.

In Bihar, the weights are assigned to individual commodities in proportion to the value of their average outturn during the triennium ending 1949-50 evaluated at the prices prevailing during 1952-53. In Kerala, for all commodities except rice, sugar and cashewnut, weights are assigned in proportion to the value of their production. For rice and molasses, weights are assigned in proportion to the value of consumption estimated by sample surveys. For cashewnut value of production and imports is taken into account. The value taken relates to the base year for all commodities. In Mysore, weights have been assigned to individual commodities in proportion to the value of quantities marketed during 1958-59 evaluated at the prices prevailing in the base year. In Punjab, the weights have been assigned to individual commodities in proportion to the value of production in the base year. In Uttar Pradesh, weights are used at two stages: (a) centre-wise weights for working out the index for the State for each commodity and (b) commodity-wise weights for working out the general weighted index for the State. Weights for a centre in respect of each commodity are based on the value of its production during the base year. Weight for a commodity is the total value of its production in the State as a whole.

In Bihar, monthly price for any commodity is arrived at as simple average of the weekly prices for each centre. A simple average of the monthly prices at different centres gives the average price for each commodity. The average monthly price of each commodity is expressed as a percentage of the corresponding price in the base year to give the commodity index. In Kerala, the monthly price of a commodity for each centre is expressed as a percentage of the corresponding price in the base period. The commodity index is calculated as the simple arithmetic mean of price relatives at various centres. In Mysore, the current weekly price of a commodity or a variety of a commodity is expressed as percentage of the corresponding base year price for each market. A simple average

of these price relatives for all the markets and varieties gives the commodity index. In Punjab and Uttar Pradesh, the quotations for prescribed varieties of commodities from selected markets are converted into price relatives of corresponding prices in the base year. The commodity index is calculated as the simple arithmetic average of centre-wise price relatives. The sub-group, group and general indices in all the States are arrived at by taking the weighted arithmetic average of the individual commodity indices.

Consumer Price Index Numbers for Agricultural Labourers— An Interim Series

The base period for the consumer price index numbers for agricultural labourers is the period from March, 1950 to February, 1951 which synchronises with the period of the surveys into family budgets of agricultural labourers which formed an important part of the First Agricultural Labour Enquiry (1950-51). This Enquiry provided data on monthly expenditure of agricultural labour families for each of the 75 zones into which the major States were divided. On the basis of these, the average annual expenditure per family in each of the 39 new zones (formed in such a way that they conformed to the Natural Divisions adopted for the 1951 Census and to the State boundaries after the States Reorganisation) has been obtained by a suitable weighting process. Base weights at the State level were obtained by weighting the zonal weights for each item by the average annual expenditure per household on that item in each zone.

Retail prices of important commodities commonly consumed by agricultural labourers were also collected during the 1950-51 Enquiry for a period of 12 months from 800 villages spread over the 75 ALE zones. A simple arithmetic average of the 12 months' prices in the base year was calculated for each ALE zone and then for each new zone by a suitable weighting process. The State average base prices were then obtained by a method similar to that used for obtaining the State weighting diagram. Current rural retail prices for all consumption items having significant weights in the family budget of agricultural labourers are being collected by the Directorate of National Sample Survey with effect from August, 1953 onwards. The price data are collected from the sample villages on the first market day or the first Saturday of every month. A simple arithmetic mean of the prices of all the villages in a particular zone is worked out. The average current zonal prices are then weighted to arrive at the State average prices, the weights being the average annual expenditure per household in the different zones on the items concerned. The average annual expenditure per agricultural labour household is worked out separately for 4 groups, *viz.*, (i) Food, (ii) Fuel and Lighting, (iii) Clothing, Bedding and Footwear and (iv) Services and Miscellaneous. In view of the difficulty of estimating house-rent and also having regard to the insignificant expenditure incurred on this item, house-rent has been excluded from average annual expenditure. The weight of each group is obtained as a percentage of expenditure incurred on that group to total expenditure. Within a group, the weights of individual commodities are expressed as percentages of the corresponding group weight.

Attempt has been made to price all the important items appearing in the 'average budget' of an agricultural labour family. The items included in a particular zone for the index are those which are well

defined and can be priced and have significant weights in the family budget of agricultural workers of the zone. It is often difficult to price a few items either for want of base price or change in the consumption pattern. The weights of the items that cannot be priced are imputed to other items expected to have broadly the same price behaviour as the items priced. In actual practice, however, it was found difficult to study the similarity in price behaviour due to want of any previous comprehensive retail price data and the weight of an unpriced item was either added to an allied item satisfying similar demand or omitted altogether from the group. If there were more than one such items, the weight was distributed according to the proportion of their weights in the group.

For each of the 15 Reorganised States, the index numbers for each expenditure group covering all the items in the group, are constructed by using Laspeyers' formula. The group indices are weighted with the corresponding group weights to obtain the general index for the State. The State indices are weighted to obtain the all-India Index, the weights being the estimated expenditure (average household expenditure multiplied by the estimated number of agricultural labour households) in the different States. The Union Territories of Delhi and Himachal Pradesh are grouped with the adjoining State of Punjab and those of Manipur and Tripura with Assam. The All-India index is proposed to be published after the concurrence of the Technical Advisory Committee on Cost of Living Index Numbers.

The Second All-India Agricultural Labour Enquiry was conducted in 1956-57 and average family budgets tabulated by the Indian Statistical Institute have become available. As recommended by the Technical Advisory Committee on Cost of Living Index Number, it is proposed to change the base period to 1956-57 and to use the new weighting diagram.

Regional or Central Series of Index Numbers constructed under the Scheme for compilation of Indicators in the sphere of Agricultural Economy

On the basis of data collected during the studies in the economics of farm management, the last 12 indices listed at the beginning of this Chapter are constructed under the 'Scheme for Compilation of Indicators in the sphere of Agricultural Economy'. The scheme is in operation in 9 Centres at present. The base period for each centre is the same as the period of farm management enquiry in that centre, viz., 1954-55 to 1956-57 for Amritsar and Ferozepore (Punjab), Meerut and Muzaffarpur (Uttar Pradesh), Salem and Coimbatore (Madras), Hooghly and 24-Parganas (West Bengal) and Ahmedabad and Nasik (Maharashtra) and 1955-56 to 1956-57 for Akola and Amraoti (Maharashtra) and 1957-58 to 1959-60 for West Godavari (Andhra Pradesh), Sambalpur (Orissa) and Monghyr (Bihar). These indicators are constructed with a view to measuring changes in certain important aspects of rural economy with the help of additional information collected on key items in the subsequent years in comparison to the base line data thrown up by the farm management studies. This scheme is in operation on a very small scale and is in experimental stage at present and as such has been distinguished from State-wide index numbers schemes.

An attempt has also been made to test the efficiency of the various index numbers constructed under this scheme by comparison with such

comparable estimates as are available. The results of this test have shown that the trend in wages and prices as revealed by the indices constructed under the Indicators Schemes shows consistency over time except in the case of Punjab and U.P. centres. Even in these centres, the trends of prices and wages appear to be better revealed by these indices than the trends revealed by agricultural wages and harvest prices data collected through the staff of State Governments. With regard to seasonal variations in wages, the Indicators Scheme data show more or less consistent rising trend of wages during the harvest period, while the agricultural wages data do not reveal any such consistent tendency. The weighting diagram of the Indicators Scheme compared to the structure of costs obtained from the ICAR studies reveals that the input structure has not undergone any significant change over the period.

State Index Numbers of Agricultural Wages

The States of Madhya Pradesh and Andhra Pradesh are regularly constructing and publishing the State index numbers of agricultural wages with 1957-58 and 1958-59 respectively as the base, while some other States are finalising their schemes in this regard.

As regards the scope and coverage, the index of agricultural wages in Madhya Pradesh covers 72 centres (one or two villages in each district), while that in Andhra Pradesh covers 60 centres (three villages in each district). The categories of labour covered are (a) skilled labour—carpenter, blacksmith and cobbler, (b) agricultural labour—field labour, herdsmen and others. In Madhya Pradesh the field labour is further divided into (i) ploughman, (ii) sower and transplanter, (iii) weeder, (iv) reaper and harvester, and (v) other agricultural labour. Except for ploughman, herdsman and skilled labour, each category is further divided into (i) man, (ii) woman and non-adult.

In Madhya Pradesh, for each type of agricultural labour in a district, the wage in the base year is calculated by averaging all the monthly wages of all the reporting centres and that in each subsequent month by averaging the wages in all the centres. The latter is then expressed as the percentage of the former to give the wage relative for the type for that month. These relatives are, however, calculated only for those types which are employed in that month. The wage relatives of different types are averaged to give the wage relative for the category and the category-wise wage relatives are further averaged to give the overall wage relative in the district for the month. The weights have been assigned to the different districts in proportion to the population of earners and earning dependents under the class of cultivating labourers in the district. The State has been divided into a number of agricultural zones, and to obtain the index for the month for a particular zone, the weighted average of the wage relative of different districts is worked out. The State index is calculated as the weighted average of zonal indices.

In Andhra Pradesh, the average wage rate for each district in respect of different categories of labour is calculated as the simple arithmetic mean of the wages prevailing at the three centres in the district during the month. The average wage rate for each category of skilled labour for the State is calculated as a simple arithmetic mean of the district wages. In the case of different categories of agricultural labour, on the

other hand, the wage rate for the State is obtained as the weighted arithmetic mean of the district wage rates, weights being proportional to the rural agricultural labour population, in the districts according to 1951 Census. The base year average wage rates are calculated as the simple average of the monthly wages. The current monthly wage rate for each category of labour is expressed as the percentage of the base year average wage rate to give the wage relative. The index number of wages of skilled labour is worked out as the average of wage relatives of carpenters, blacksmiths and cobblers. The simple average of wage relatives of different categories of agricultural labour is taken as the index number of agricultural wages.

Index Numbers of Parity between Prices Received and Prices Paid by the Farmers

At present, the State Governments of Assam, Kerala, Orissa, Punjab and West Bengal are compiling the index of Parity between Prices Received and Prices Paid by the Farmers. Surveys for collection of basic data for working out the weighting diagram for this Index are at present in progress in the States of Bihar, Madhya Pradesh, Mysore and Punjab.

The base period adopted is the calendar year 1944 in Assam, agricultural year 1952-53 in Kerala, August 1939 in Orissa, August 1938—July 1939 in Punjab and calendar year 1939 in West Bengal. West Bengal also constructs indices with three other base periods, *viz.* calendar year 1948, previous year, and previous month.

(1) Index Numbers of Prices Received

The commodities included and weights assigned to them are determined on a joint consideration of their marketed surplus and availability of price data. In Assam the weights have been assigned to the different commodities in proportion to the value of their marketed surplus based on the Rural Economic Survey conducted in 1949-50 in the plain districts of the State; in Kerala in proportion to the value of production during the base period; in Orissa in proportion to the average value of the marketed surplus during 1936-37 to 1938-39; in Punjab generally in proportion to the value of marketed surplus of the commodities during 1938-39; and in West Bengal in proportion to the average value of marketed surplus of the commodities during the period 1947-48 to 1950-51. The price data used in the construction of the index relate to wholesale prices in Assam, Kerala, Orissa, and Punjab. In West Bengal monthly indices are based on the monthly wholesale prices and annual indices on the farm harvest prices.

The method of construction for the index numbers of prices received is the weighted geometric average of the monthly price relatives for individual commodities in Assam, Orissa and West Bengal. In Kerala a simple arithmetic mean of the prices of the different centres in a district gives the district price. The district prices are weighted with district production figures in 1956-57 to obtain the State average price. Weighted geometric mean of the State price relatives of different commodities gives the index. In Punjab, a simple average of the fortnightly prices gives the monthly price of a commodity. A weighted geometric average of the monthly price relatives of the commodities gives the index.

(2) Index Numbers of Prices Paid

(i) **Index Number of Domestic Expenditure.**—The various items of consumption included in the State series of Assam, Orissa and Punjab account for 70 to 80% of the total cash expenditure and are fairly representative of the total domestic expenditure. In Kerala, the average cost of living index for 12 centres with the base changed to 1952-53 is taken to represent the index of domestic expenditure.

The weights are based in Assam on the results of the enquiry into domestic expenditure of rural families conducted in 1948-50 in the plain districts; in Orissa on the tentative estimates of expenditure of an average agricultural family; and in Punjab and West Bengal on the family budget surveys conducted during 1939-40 and 1944-45 respectively.

The prices used in the construction of the index are weekly retail prices in Assam and West Bengal and monthly retail prices in Orissa and Punjab. Generally the weighted geometric average of the monthly price relatives of individual commodities is taken in all the States to obtain the overall index of domestic expenses.

(ii) **Index of Farm Cultivation Costs**—Items of cost included in the compilation of this index include seeds, labour, depreciation, rent and interest, etc. Weights have been assigned on the basis of enquiries into cost of cultivation conducted in the State of Assam, Orissa, Punjab and West Bengal. In Kerala, the weights are rough, as no enquiry has been conducted to determine the weights for items of farm cultivation cost. The index numbers of the cost of cultivation are calculated in all the States by taking weighted geometric average of the relatives for individual items.

Consolidated Index of Prices Paid

The index number of prices paid by the farmers is constructed by taking the weighted geometric average of the indices of domestic expenditure and farm cultivation costs, weights being proportional to the expenditures on domestic and farm accounts to the total expenditure.

Index Number of Parity

The index number of parity between prices received and prices paid by the farmers is calculated by taking the ratio of the index of prices received and the index of prices paid by the farmers multiplied by 100.

Summary of Discussions

Appreciating the comprehensiveness and usefulness of the notes prepared by the Directorate of Economics & Statistics on the subject, the Group desired to know whether these index numbers were being constructed with a view to prepare national agricultural sector accounts. It was pointed out that the National Income Division of the C.S.O. was doing some work in this regard, but the latest developments were not known. The desirability of associating the Directorate of Economics & Statistics with the work being done in the CSO was stressed.

It was observed that considerable progress had been made by the States in constructing the indices of agricultural production, area under crops and agricultural productivity, but much leeway had to be made with

regard to construction of other indices by the States and with regard to standardisation of procedures. Certain technical aspects involved in the construction of these indices were not properly followed by some of the States. It was, therefore, proposed to impart training in the theory and methodology of construction of these indices, to the staff associated with them in the States. The need for training of the State staff at periodic intervals was appreciated and it was suggested that a list of key indices should be prepared and recommended to the States and that a blue-book giving the instructions for the construction of these indices should be prepared for the guidance of the staff entrusted with this work.

A point was raised whether the all-India index numbers of agricultural production, area under crops and agricultural productivity were built up from the State indices or constructed directly. It was explained that although it would be ideal to build up the all-India indices from the State indices, there were certain difficulties in doing so at the moment, and therefore, the all-India indices were constructed directly.

A few suggestions were also made regarding the improvements in the construction of the index numbers. It was suggested that the base period for the agricultural index numbers should cover a period of 3 years or more rather than a single agricultural year. Substitution of geometric mean by the arithmetic mean in the construction of index numbers of farm (harvest) prices was further recommended. The need for extending the coverage of farm (harvest) prices to more crops and of using the farm (harvest) prices instead of the 'harvest season prices', as at present, was also stressed. Besides these, the Group realised the need and scope for introducing further improvements particularly in regard to the index numbers which were not published at present, and it was decided that a Technical Committee should be set up to go into these improvements and suggest ways and means to effect them.

Recommendations

In the light of the notes considered and the discussions held the Working Group made the following recommendations :—

1. Attempts should be made to construct the various index numbers relating to agricultural economy with a view to preparing National Agricultural Sector Accounts and the Directorate of Economics & Statistics, Ministry of Food & Agriculture should be associated with the work to be undertaken in this regard.
2. A list of key indices relating to agricultural economy should be prepared and recommended to the States, and the States should be given necessary technical and financial assistance to enable them to compile these indices.
3. A blue-book giving uniform concepts and definitions, standardised procedure and the detailed instructions for the construction of these indices should be prepared for the guidance of the concerned staff in the States.
4. Training in the theory and methodology of construction of index numbers should be imparted to the staff associated with them in the States at periodic intervals.

5. Ways and means should be explored to build up the all-India index numbers of agricultural production, area under crops and agricultural productivity from the similar State indices.
6. In view of the urgent need and large scope for introducing further improvements particularly in regard to the index numbers which are not published at present, a Technical Committee should be set up to go into these improvements and suggest ways and means to effect them.

Financial Provision

A financial provision of Rs. 7 lakhs was suggested during the Fourth Plan period for enabling the States to compile the different index numbers and the Directorate of Economics & Statistics, Ministry of Food & Agriculture to guide and coordinate the work of the States in this regard.

DERIVED STATISTICS IN THE FIELD OF AGRICULTURE**Summary of the Note Received (DES-9)**

Derived statistics in the field of agriculture are required in connection with estimation of national income from agriculture, demand projections of various agricultural commodities, calculation of input-output and cost-benefit ratios, etc.

National Income Estimation.—The important items for which reliable estimates needed in connection with estimation of national income are not available, are fruits, vegetables, minor millets, pulses and oilseeds, straw and other bye-products, technological ratios in respect of conversion of milk to various milk products, seed-rates, cattle-feed, wastage, etc. For the estimation of national income, in addition to data on production, information regarding prices and costs to evaluate the production and to determine the net product is also required. While considerable improvements in statistics of prices have been effected during recent years, the position regarding the availability of data in respect of inputs and other costs in agriculture is still unsatisfactory. As a result, only tentative estimates in respect of these items are made after sitting sporadic data available in reports on marketing surveys, farm management studies and NSS surveys. Estimates in respect of straw, stalks, etc. are derived on the basis of scanty data available with State Governments, Research Stations, etc. Similarly, the values of unspecified minor crops are estimated by relating them to the values of comparable items based on information published in NSS Report on Certain Aspects of Cost of Cultivation. A satisfactory system of obtaining reliable and comprehensive data on inputs, costs, etc. in agriculture at the aggregate level and other items listed above, at least once in five years, thus need to be evolved.

Demand Projections.—In the formulative stages of a Plan, whether it be the perspective Plan or the Five-Year Plan, estimation of demand for various agricultural products is indispensable. The demand projections so far attempted have been of elementary type, and for want of adequate data the estimates provided are rough and tentative. Time series on a comparable basis over a long period are not available. The available data on expenditure elasticities of demand thrown up by the NSS reveal wide fluctuations from round to round. Quantity elasticities and income elasticities of demand for various agricultural products are also not available for all the NSS rounds. In planning for a balanced and nutritive diet for the country, the absence of reliable information on the existing levels of consumption of a number of protective and supplementary food items is a serious handicap. The other gaps or requirements of statistics in this field relate to estimates, at State level, of availability and consumption of different commodities, inter-State movement of commodities, quantity and expenditure elasticities of various commodities, etc. It is also difficult to estimate the derived demand for commercial crops like cotton and oilseeds. The conversion rates between sugar and sugarcane, between gur and sugarcane, etc. also need to be based on scientific studies. The gaps in

availability of information required in connection with estimation of demand for different agricultural commodities may be summarised as follows :

Gaps in Data needed for Demand Projections

Item				Level at which estimates are needed	Agricultural commodities for which information is required
Population growth	..	..	..	Rural and Urban Sectors separately.	—
Savings	..	..	..	Do.	—
National Income	..	..	..	Do.	—
Household Income	..	..	..	Do.	—
State Income, State-wise	..	..	..	Do.	—
Income or expenditure elasticity	..	..	..	All-India, Regions and States.	All commodities for which demand estimates are to be made.
Quantity elasticity	..	..	..	Do.	Do.
Price elasticity	..	..	..	All-India and Regions.	Substitute goods.
Private Stocks	..	..	..	Do.	All commodities.
Inter-State movement of commodities				—	Major commodities covering all modes of transport.
Consumption	..	..	..	All-India, separately for Urban and Rural Sectors.	Rice, wheat, other cereals, pulses, vegetable oil, etc.
Production	..	..	..	All-India, Regions and States.	Fruits, vegetables, meat, fish, egg, milk and milk products.

Capital-Output and Cost-Benefit Ratios.—The overall allocation to agriculture within the total plan outlay is at present determined mainly on the basis of the aggregate costs of the different Schemes included in the State and Central Plans. But once the rate of increase in national income in any given Plan is known and the share of agriculture is also determined, the investments necessary for achieving this increase could be estimated fairly accurately by using the capital-output ratios. Precise coefficients of such capital-output ratios for investment in agriculture have not yet been worked out although some sporadic attempts have been made to determine them in isolated fields of programme.

In formulating and even determining the consistency of any Plan, the technique of input-output or inter-industry table is generally adopted in advanced countries. Under this technique, the contribution of agriculture to other sectors of the economy is worked out as also the contribution of the latter to the former. An attempt is thus made to secure balances between and within different sectors. Similarly, within agriculture, inter-industry tables are worked out for different sub-heads of development such as livestock, fisheries, forestry, etc. Such studies are being initiated in India. Efforts in this direction need intensification.

Data on cost-benefit ratios of different schemes are required for determining their *inter-se* priorities. The question of relative investment to be made in major and medium irrigation on the one hand, and minor irrigation on the other, can be decided, among other things, on the basis of cost-benefit ratios. Similarly, the relative contribution of irrigation and fertilisers to the national target of agricultural production might also be determined on the basis of cost-benefit ratios.

An attempt was made in 1958 by the Ministry of Food & Agriculture to collect relevant information from States regarding costs and benefits from different types of minor irrigation schemes on the basis of experience of the first three years of the Second Plan. Broadly, the information collected included nature and costs of works, particulars of assistance, dimensions and capacity of works, area benefited and additional production expected from the area benefited. Such studies are necessary for other schemes also.

Employment and Personnel.—One of the main objectives of the Plan is to utilise to the fullest possible extent the manpower resources of the country and to ensure substantial expansion in employment opportunities. The available data with regard to direct and indirect employment potential created by agricultural schemes are far from complete and do not enable an assessment to be made of progress in this aspect.

Estimates of Seed, Feed, Wastage, etc.—For estimating the net availability of cereals and other foodgrains for human consumption, information is required in respect of seeds, feeds, wastage, etc. According to the traditional ratio based on the information contained in the Reports on Marketing Surveys conducted by the Agricultural Marketing Adviser to the Government of India, an allowance of 12.5% is made from the gross production of cereals and gram for seed, feed and wastage, etc. to arrive at the net production available for human consumption. To the extent information on the quantity of seed per acre is not available from the Marketing Reports, the NSS data are made use of on the assumption that the zonal rates hold true for individual States within a zone. It is essential to collect data on seeds, feeds and wastage through specially designed surveys. It may also be necessary to have estimates of the difference between the yield in the field and that yield which the farmer gets on his threshing floor and of losses that further occur till the produce reaches the consumer.

Summary of Discussion

It was observed that in the field of national income estimation, the data in respect of inputs and other costs in agriculture, production of by-products and minor crops, etc., would have to be collected once in five years, if not every year. As regards demand projections of various agricultural commodities, it was emphasised that the gaps in availability of information relating to population growth, savings, national income, household income and State income separately for rural and urban sectors; income or expenditure, quantity and price elasticities; private stocks; inter-State movement of commodities; consumption separately for rural and urban sectors, etc. should be filled up during the Fourth Plan period. Data thrown up by NSS, Agro-Economic Research Centres, Farm Management Studies, Cost of Production Surveys, etc. might be made use of and

further efforts should be made to fill the gaps that remained. The necessity for working out capital-output and cost-benefit ratios for sectors and sub-sectors of the agricultural economy as well as for different types of schemes and areas and for collecting data on direct and indirect employment potential created by agricultural schemes, was also emphasised. It was felt that while the data on seeds could be collected in the course of crop-cutting surveys and farm management studies and those on feed in the course of surveys on animal husbandry practices, a special enquiry possibly organised in conjunction with farm management or agro-economic centres was called for to collect data on wastage at the various stages.

The Group further decided to remit the detailed examination of the measures necessary to fill the gaps in the derived statistics, to the Technical Committee to be set up for the Index Numbers relating to agricultural economy.

Recommendations

The Working Group made the following recommendations :

1. Necessary surveys should be conducted once in five years, if not every year, to collect data on inputs and other costs in agriculture, production of bye-products and minor crops, etc. required for purposes of national income estimation.
2. Data thrown up by the National Sample Survey, Agro-Economic Research Centres, Farm Management Studies, Cost of Production Surveys, etc., should be made use of for filling the gaps in availability of information relating to population-growth, savings, national income, household income, State income and consumption separately for rural and urban sectors; income or expenditure, quantity and price elasticities; private stocks; inter-State movement of commodities, etc. which are required for working out demand projections of various agricultural commodities. Further efforts should also be made to collect additional information to fill the gaps that still remained.
3. Necessary surveys should be conducted for working out capital-output and cost-benefit ratios for different sectors and sub-sectors of the agricultural economy as well as for different types of schemes and areas and for collecting data on direct and indirect employment potential created by agricultural schemes.
4. While data on seeds could be collected in the course of crop cutting surveys and farm management studies and those on feed in the course of surveys on animal husbandry practices, a special enquiry should be organised to collect data on wastage at the various stages.
5. The measures necessary to fill the gaps in the derived statistics should be examined in detail by the Technical Committee to be set up for the Index Numbers relating to Agricultural Economy.

Financial Provision

The cost during the Fourth Five Year Plan on account of the various studies and surveys to be undertaken for filling the gaps in the field of derived agricultural statistics was estimated at Rs. 12 lakhs.

CHAPTER XIII

PERSONNEL FOR AGRICULTURAL RESEARCH STATISTICS IN STATES

Summary of the Note Received (IARS-4)

The Agricultural Personnel Committee set up by the Planning Commission in 1957 recommended that the statistical research in respect of agriculture, animal husbandry, etc. should be promoted by setting up appropriate statistical sections in these departments as it was realised that research in these fields was very inadequately served by statistics. Accordingly, the Ministry of Food & Agriculture advised the State Agriculture and Animal Husbandry Departments, Central Institutes and Commodities Committees to create statistical cells in their respective organisations. It was made clear that the functions of these statistical cells would be to help research workers in designing experiments and planning sampling investigations and in analysis and interpretation of the results obtained. It was also stressed that the statisticians to head these units should be well qualified and competent and given higher status so as to advance the statistical research. However, owing to reduction in the plan outlay in most of the States and due to other consideration such as non-availability of qualified personnel, most of the State Governments could not implement the scheme and as such the statistical research did not achieve the expected progress. The Commodities committees have, however, recently created statistical and economic research units in their organisations.

The functions of the statistical units in the State Agriculture Departments would be to help the departments in the planning of research programmes and provide assistance in analysis and preparation of reports, to render help and assistance to specialists in the departments in their research projects, to give refresher training courses in agricultural statistics to the departmental staff, to carry out sample surveys for estimating crops which are not the responsibility of any other agencies in the State, to carry out studies in the improvement of agricultural statistics on the basis of available data and on the basis of surveys to be carried out by the Statistical Unit, to carry out any *ad hoc* studies on behalf of the department, to develop yardsticks for the various inputs for increasing agricultural production, to prepare State index of experiments for the benefit of research workers to assist the department in the development of agricultural plans, to undertake research in statistical techniques useful in agricultural research, to assist the various working groups set up by the department by supplying them the necessary statistical material for their work, and to assess the progress and achievement of the plan scheme and wherever necessary to conduct sample surveys.

On the basis of the recommendations of the Agricultural Personnel Committee it was suggested that the statistical cells for research in the State Departments of agriculture should be headed by 1 senior statistician corresponding to the post of Deputy Director of Agriculture in the State and should have 2 junior statisticians, 3 assistants and 6 computers on an average in each of the major States. In case of smaller States statistical staff recommended for research work was a senior statistician, two

statistical assistants and four computers. The State departments of agriculture, which are responsible for crop surveys and improvement of agricultural statistics may have to be further strengthened to meet the demand of planning and developmental statistics required by the State and the Centre. At present excepting the States of Maharashtra, Uttar Pradesh, Punjab, Himachal Pradesh and Rajasthan, the scheme does not seem to have been implemented fully in other States. Therefore, it is necessary that the scheme is continued in the Fourth Five Year Plan so that all the States are enabled to establish statistical units in the Departments of Agriculture to meet the demands of planning and assessment of the various development programmes that are already in progress. It was also suggested by the Agricultural Personnel Committee that all the principal Central and State Research Institutes should have a statistical section headed by a competent statistician. The post-graduate agriculture college should have 1 professor, 1 assistant professor or lecturer, 3 demonstrators and 9 computers for teaching and for giving guidance in planning the experiments to be conducted by the staff and post-graduate students and in interpretation of the data thereof. In order to enable the statistical units to undertake the field surveys it will further be necessary to have field units consisting of field investigators and supervisors permanently attached to the statistical units.

Summary of Discussion

The need for statistical cells in the State Departments of Agriculture to introduce improvements in agricultural statistics and to promote research was emphasised. It was pointed out that the functions of these statistical cells would be to help research workers in designing experiments and planning sampling investigations and in analysis and interpretation of the results obtained. It was also felt that the State Departments of Agriculture, which are responsible for crop surveys and improvement of agricultural statistics, should be strengthened to meet the demand of planning and developmental statistics required by the State and the Centre. In order to enable the statistical units to undertake the surveys, it was emphasised that field units consisting of field investigators and supervisors should be attached permanently to the statistical units.

Recommendation

In order to fill the serious gaps in the statistics relating to agricultural research, and to improve the quality and range of the existing statistics, the Group recommended that :

Full-fledged Statistical Units under competent, qualified statisticians should be set up in Agriculture Department in each State.

Financial Provision

The cost on account of setting up statistical cells for agricultural research in the Agriculture Departments in the different States during the Fourth Plan period was estimated at Rs. 30 lakhs and that for advance action during 1964-65 or 1965-66 at Rs. 4 lakhs.

CHAPTER XIV

ANIMAL HUSBANDRY AND DAIRYING STATISTICS IMPROVEMENTS IN ANIMAL HUSBANDRY AND DAIRYING STATISTICS

Summary of the Note Received (DES-10)

The data on livestock and poultry numbers and agricultural implements are collected through Quinquennial Livestock Census conducted by the State Governments under the guidance of the Directorate of Economics & Statistics in the Ministry of Food & Agriculture. The recent censuses have been conducted on improved lines and rationalised supervision over census enumerations have been carried out. The results of this supervision and the sample verification conducted by the NSS have demonstrated the reliability of the census data. The census now provides comprehensive reliable data on different categories of livestock population classified according to sex, age and utility. In July 1957, the Ministry of Food & Agriculture requested the Directorate of NSS to examine whether in the light of the survey conducted by it for the sample verification of livestock census it would be feasible to estimate livestock numbers annually during inter-censal years with a reasonable degree of precision. The NSS Directorate was of the view that annual estimates of livestock numbers could not be included as a regular part of NSS.

As regards data on livestock products, the Directorate of Marketing and Inspection (DMI) frames estimates of production, utilisation, demand, etc. of livestock products based on the marketing surveys carried out by it and data on livestock numbers provided by the Livestock Census. The commodities surveyed so far and for which Marketing Reports have been published are milk, ghee and other milk products, wool, hair, hides, skins, meat, bristles, poultry and eggs.

The total annual milk production by the DMI is estimated as a product of number of animals kept for breeding or milk production, proportion of animals actually in milk, average lactation period and average daily milk yield per animal in milk. As livestock census figures are available on quinquennial basis and the surveys for finding out the average yield of milk of different categories of milch animals are conducted occasionally, year to year changes in milk production have become difficult to assess. The estimates of average daily milk yield and lactation period are based on personal and not scientific enquiries. The estimate of milk production further refers to the lactation period of the animals in milk on the reference date of the Census, and not to the whole year for all the animals that give milk during the year. The effect of seasonal changes in the number of animals in milk such as those connected with their calving season, etc. is thus not taken into account in this estimate. An immediate improvement that could be thought of in the present DMI formula for estimation of annual milk yield will be the replacement of the factor proportion of animals in milk by the factor "the ratio of the whole year to the average calving interval per animal" which is comparatively free from seasonal variation. But the satisfactory method of estimating the

annual yield of milk in different parts of the country would be to examine the milk yield records for a large number of cows and buffaloes over a long period.

The output of milk products, e.g., ghee, butter, dahi, cream, khoya, channa, etc. is estimated by the DMI by making use of certain conversion ratios fixed on the basis of *ad-hoc* enquiries. Statistics of milk products are expected to improve with the improvement in the statistics of milk production. The reliability of the data on milk products could further be enhanced if scientific surveys are conducted on regional basis to arrive at reliable estimates of conversion ratios.

Data on meat, hides and skins, wool and hair, bones, eggs, etc. contained in DMI Marketing Reports also suffer from similar defects and sample surveys are necessary to obtain reliable data on them.

The National Sample Survey also collects information on production, consumption and utilisation of milk and other livestock products during some of the rounds. Data on output are collected by the interview method and the period of reference differs from round to round. Annual estimates are obtained directly from the monthly estimates and as such seasonal bias is not eliminated. The interview method of collecting the data, the changing reference period, the differences in period of survey, etc., reduce the usefulness of NSS data.

The I.A.R.S. has developed now a suitable sampling technique for estimation of production of milk and other livestock products, viz., eggs, wool and meat and for collection of data on animal husbandry practices. The technique for the sample survey on milk consists of a detailed survey extending over a whole year in which the milk yield in respect of the selected animals is recorded by actual weighment. When these surveys are conducted in sufficiently large number of States it should be possible to provide reliable estimate of production of milk and other livestock products in the country.

Dairy statistics such as capacity of handling and present handling of dairies, quantity of milk marketed, prices, quantity of milk utilised for different products and production of dairy products like butter, cheese, condensed milk, evaporated milk, whole-milk powder, skimmed-milk powder, casein, margarine, ghee etc., stocks of dairy products are often required for proper planning and execution of programmes for assessing the progress of various developmental schemes relating to these items. It is suggested that to begin with an attempt may be made to collect data of various dairy products in respect of the dairies owned by the Government and Cooperative Societies.

SURVEYS FOR ESTIMATION OF ANNUAL PRODUCTION OF IMPORTANT LIVESTOCK PRODUCTS AND FOR COLLECTION OF DATA ON ANIMAL HUSBANDRY PRACTICES

Summary of the Note Received (IARS-5)

With a view to filling the gaps in the availability of adequate and reliable statistics on livestock products, the IARS had conducted pilot sample surveys in the typical tracts during the Second Five Year Plan for evolving a suitable sampling technique for collection of statistics of annual

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milk production and bovine keeping practices. The tracts covered during the Second Plan were Punjab, eastern Uttar Pradesh, Gujarat, Coastal and adjoining districts of Andhra Pradesh and Coastal districts of Orissa. The scope of these investigations were extended to other important livestock products, *viz.*, eggs and wool during 1959-60 and the tracts covered were Andhra Pradesh (only typical districts) and Kerala for the surveys on egg-production and poultry practices; and Joria region of Gujarat State and Rajasthan State for the survey on wool production and sheep-rearing practices.

Under the Third Plan, the IARS have been repeating the investigations on milk production and bovine-keeping practices in the same tracts as were covered during the Second Plan with the object of assessing the changes in level of production and bovine-keeping practices as a result of various developmental programmes. As these surveys are confined only to typical areas, the Ministry of Food & Agriculture had addressed the State Governments to undertake similar surveys in other areas. However, with the exception of Rajasthan and Uttar Pradesh, the State Governments have not made any progress in conducting such surveys due to financial stringency. In view of this, the IARS has now proposed surveys to a few more areas during the Third Five Year Plan. When these surveys are conducted in a sufficiently large number of States it should be possible to provide an all-India estimate of annual milk production. Similar surveys are also proposed for eggs and wool in the other important tracts to provide reliable estimates of annual production of eggs and wool in the country.

With a view to obtaining reliable estimates of annual production of the important livestock products and also to assess the relative change in the level of the production and in the livestock practices, a coordinated scheme has now been proposed to conduct such surveys on milk, eggs, wool, and meat in all the States of the country during the Fourth Plan period. Appropriate probability sampling methods will be utilised to collect the data. The experience gained by the IARS under the surveys conducted during the Second and Third Plan periods will be utilised in planning the surveys under this coordinated scheme. In the case of surveys on milk and eggs detailed data will be collected by physical weighing of daily production of milk and eggs and feed supplied to animals from a representative sample of animals selected in the tract. Besides, data will also be collected on breeds, stage and order of lactation of the animals in milk and the various rearing practices of bovines and poultry. A similar procedure will be adopted to collect reliable data on production of wool and meat of sheep and also the various sheep practices obtaining in the areas.

The work of these investigations will be considerably facilitated if the State Governments set up full-fledged Statistical Units in their Animal Husbandry Departments, which could undertake these surveys under the technical guidance of the IARS. However, as mentioned earlier, owing to the cut imposed in the outlay in the agricultural sector in the Third Five Year Plan, the original proposals of the States with regard to setting up of Statistical Cells in the Animal Husbandry Departments were revised. In the States of Andhra Pradesh, Jammu & Kashmir, Maharashtra, Gujarat, Orissa and West Bengal, no Statistical Unit has yet been set up. In some of the States such as Punjab, Rajasthan and Uttar Pradesh a small

section headed by a non-gazetted official has been established. It is only in the States of Madras and Mysore that the recommendation of the Agricultural Personal Committee in this regard have been appropriately implemented.

As mentioned earlier, the main functions of the proposed Statistical Units will be to assist research workers of the Animal Husbandry Departments in planning their experimental investigations and sampling programmes on sound lines with the help of methods based on the modern science of statistics. These units will also train the research workers in properly analysing their data and drawing proper interpretation from experimental results. They will be of great help to the State Animal Husbandry Directors in planning the projects in the Five Year Plans and assessing their progress. They will compile whatever data are already available on various aspects of information likely to be of use and interest to their departments. The statistician will also initiate random sample surveys for the estimation of livestock products and collection of such other statistics as are of interest to the Animal Husbandry Departments. In carrying out his duties, the Statistician will require specialised knowledge in statistical applications to animal breeding and genetics, bio-assays etc. and will have to discuss the planning of experimental investigations with subject-matter specialists. It is necessary that a well-qualified and trained person is appointed to head the Statistical Unit and is given a proper status.

Due to the unsatisfactory position in implementing the Scheme in the Third Five Year Plan it is necessary to continue the scheme in the Fourth Plan in all those States where the statistical cells have not been established and provision should also be made for a modest expansion in the staff in some of the States where the Statistical Cells have been established. In the major States the statistical unit should be headed by a senior statistician corresponding to the post of Deputy Director, and have 2 junior statisticians, 3 assistants and 6 computers, and in the smaller States the Units may have one senior statistician, 2 assistants and 4 computers. It is also suggested that at the principal Livestock Research Stations, the Statistical Sections should be headed by a competent statistician and the statistical departments of post-graduate veterinary colleges should have one professor, one assistant professor or lecturer, 3 demonstrators and 9 computers.

During the Third Five Year Plan period several dairy development schemes have been implemented in different States and provision is also made in the dairy sector of each State for establishment of statistical unit. These Statistical Units in the States were suggested for carrying out surveys around the milk pockets to assess the availability of milk for dairy plants and to study the various statistical problems facing the dairy industry. However, in most of the States these units do not seem to have been established. It is necessary to provide the Dairy Development Departments of all the States with Statistical Units for analysing the data collected during the surveys and for solving the various problems connected therewith. Each Statistical Cell may consist of one statistician, two assistants and four computers.

Summary of Discussion

The Group observed that so far as the statistics of livestock numbers were concerned, the Livestock Censuses of 1956 and 1961 were

well-organised and the Directorate of Economics & Statistics was seized of the problems of improvement in future censuses. The need for setting up of a suitable Unit in the Economics & Statistics Directorate for this purpose was recognised. It was felt that the States should be enabled to take up the surveys on the lines developed by the I.A.R.S. for assessment of annual milk production as a normal activity of their Animal Husbandry Departments. In addition to establishment of adequate Statistical Units in Animal Husbandry Departments in the States the desirability of building up of a system for obtaining regular estimates of the different livestock products, was also stressed. Till all the States took up the surveys the need of extending and repeating IARS surveys to build up the estimates of production of milk and other livestock products at the all-India level, was emphasised. It was noted with satisfaction that IARS proposed to undertake surveys in the remaining important regions for providing approximate all-India estimates in respect of egg and poultry during the Third Plan period itself. The Group recommended that similar gaps in estimates of wool production might be filled by undertaking surveys in the remaining period of Third Five Year Plan in the States not yet covered. The Group was informed that the surveys for estimation of sheep and wool at present covered mutton (sheep meat) but not goat meat. It was pointed out that the estimation of meat required considerable care and thought but efforts should be made to cover under the present surveys other kinds of meat.

It was pointed out that adequate data on dairy projects were not available. The Group appreciated the need for the creation of suitable Statistical Unit under the Livestock Development Adviser in the Ministry of Food & Agriculture. This unit would also advise the States on the types of the data and the frequency with which these should be collected.

In view of the urgent need to fill serious gaps in animal husbandry, and dairying statistics both at the State and Central levels, the importance of establishment of statistical units in the State Departments of Animal Husbandry and Dairy was fully appreciated. It was decided that the question of setting up these Statistical Cells should be pursued vigorously and advance action should be taken in the Third Plan itself.

Recommendations

In order to fill the serious gaps in the statistics relating to animal husbandry, and dairying, and to improve the quality and range of the existing statistics, the Group made the following recommendations :

1. Full-fledged Statistical Units under competent, qualified statisticians should be set up in Animal Husbandry and Dairying Departments in each State.
2. Similar Statistical Cell should be set up under the concerned Adviser in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.
3. Till the State-wide surveys were undertaken by the respective States, the Institute of Agricultural Research Statistics should extend its surveys for estimation of production of milk, meat, egg and poultry and collection of data on animal husbandry, sheep-rearing and poultry practices to the areas not covered so far, so as to provide estimates at least at the all-India level. The

IARS should also repeat these surveys at suitable intervals in order to study changes taking place.

Financial Provision

The cost on account of implementation of the various recommendations of the Group during the Fourth Plan period and for advance action during 1964-65 or 1965-66 was estimated as follows :

Scheme	(Rs. in lakhs)	
	Financial Provision for the 4th Plan period	Financial Provision for advance action during 1964-65 or 1965-66
Creation of Statistical Cells in State Departments of Animal Husbandry & Dairy.	40.00	8.00
Creation of Statistical Cells at the Centre for Animal Husbandry & Dairying Statistics	4.00	0.80
Estimation of Production of Milk and other Livestock Products	40.00	—

IMPROVEMENT OF FORESTRY STATISTICS

Summary of the Note Received (DES-11)

The Directorate of Economics & Statistics in the Ministry of Food & Agriculture collects with the help of the staff of the State Forest & Revenue Departments the statistics of (i) areas under forests according to the nature of ownership, types, legal status and composition, areas closed and open to grazing, areas protected from fire and causes of fire, progress of survey operations, demarcation and maintenance of forest boundaries, progress of forest settlement and afforestation; (ii) volume of standing timber and fire-wood and scope for expansion of exploitable forests; (iii) outturn both in terms of quantity and value of different types of timber, fire-wood and forest products removed by different agencies; (iv) revenue and expenditure according to different items; and (v) other statistics pertaining to employment in forests and forest industry, breeches of forests rules, etc. These forest statistics flow mostly as a bye-product of forest administration.

These data suffer from certain defects and need improvement to serve the needs of various development programmes. The statistics of areas under forests other than those relating to ownership, types, legal status as well as the statistics of volume, are available in respect of State forests only. In order to have complete picture of the volume of existing stock and outturn on annual basis, it is necessary to build up estimates in respect of forests owned by corporate bodies and private individuals. Statistics of trees outside forests also need to be collected. The estimation of national income requires data on prices at stump, cost of felling, cost of rough hewing & topping, etc., cost of transportation from stump to market centre, cost of maintenance of boundaries and survey operations, cost of regeneration, etc. Further, there are two sets of figures relating to areas under forests, one according to Land Utilisation Statistics, and the other according to Forest Administration Reports. It is necessary to reconcile the two sets of figures in order to avoid confusion. Some improvements have no doubt, been recently effected in the available data, yet they are inadequate for purposes of assessing the national income and also for the formulation and implementation of the forestry development programmes. The scope of the forestry statistics has further to be enlarged to enable collection of data on other aspects in line with other countries of the world. The Food & Agriculture Organisation and the British Commonwealth Forestry Conference have desired that in line with other countries India should also collect data with regard to open areas in the forests, bamboo stands, volume of trees of saw-timber size and of those of lesser size, losses in forests caused due to shifting cultivation and those caused in the process of logging and transportation. For ensuring collection of more reliable data on forestry products as also for enlarging their scope to these items, it would further be necessary to examine the basic returns maintained by the State Forest Departments and suggest modifications in these primary returns. The concepts and definitions adopted at

present for the various terms used in the forestry statistics also need standardisation.

With the emergence of forestry as an organised undertaking under the development plans, there is a growing interest and emphasis on the study of economics of forestry. A number of schemes for new plantations, rehabilitation of degraded forests, survey and demarcation of forests, cultivation of fast growing species, etc. have accordingly been taken under the successive Five Year Plans. The Third Five Year Plan attaches special importance to the economic aspects of long-range forest development programmes. It envisages realisation of sustained increase in production through intensive forest development schemes including planting of fast growing species, selection of high yielding areas, introduction of improved techniques and linking of forest development with specific schemes of industrial development. New types of data are required for formulation and execution of these development programmes. In view of the increasing tempo of forest development and exploitation, intensification of *Vanmahotsav*, formulation of 10-year perspective plans for forest development under the Fourth and Fifth Plans and the measures for forest development under the UNO Programme, there is increasing demand for fresh type of data relating to development and exploitation of forests, production of timber, sleepers, bamboo, etc., requirement and utilisation of foreign exchange, allocation of timber to institutions and industries, etc.

A Statistical Cell in the Forest Department of each State is necessary to effect the improvements suggested above. Statistical research in forestry has lagged behind for want of statistical units in the State Forest Departments. The problems faced in forestry planning are numerous. The Statistical Cells in the State Forest Departments will also solve these problems and guide the research workers in planning the experiments in forestry. This Statistical Cell in each major State should have a staff of 1 statistician, 2 assistants and 4 computers.

A Statistical Unit is also necessary at the Centre to coordinate and guide these improvements and also to collect other statistics on economic aspects of forestry. There will be considerable advantage both from operational and technical angles if this Cell is located in an Organisation which is equipped with the technical knowledge of forestry and is concerned with day-to-day administration and execution of forest development programmes. The proposed Cell will, therefore, have to be located under the Inspector General of Forests (IGF), and, in addition to the data already listed, it will also deal with the data connected with operational and administrative aspects of forestry, *viz.* (i) forest area under different species of timber and the actual production thereof, (ii) area under different types of forest on climatic basis, (iii) variation in forest areas and plantations raised inside and outside forests, (iv) rational land utilisation to determine the extent to which the area can be acquired for afforestation, (v) timber trends and prospects on a long-term basis, (vi) forest management and employment, and (vii) foreign trade in timber and minor forest produce. The Statistical Cell under the IGF will work in close collaboration with the Directorate of Economics & Statistics in order to ensure over-all coordination, determine priorities for collection and analysis of data in the context of national requirements and to effect standardisation of concepts and definitions.

Summary of Discussion

The Group noted the serious gaps in forestry statistics with regard to both regular and Plan statistics, and the need for collection, coordination and publication of these statistics was emphasised. The Group appreciated the need for the creation of suitable Statistical Unit either directly in the E. & S. Directorate or as an affiliated unit of the Directorate under the Adviser for Forestry Development. This unit would also advise the States on the types of the data and the frequency with which that should be collected.

In view of the urgent need to fill serious gaps in forestry statistics both at the State and Central levels, the importance of establishment of statistical units in the State Departments of Forestry was fully appreciated. It was decided that the question of setting up these Statistical Cells should be pursued vigorously and advance action should be taken in the Third Plan itself.

With regard to the discrepancies between two sets of figures of forest area, it was decided that the Standing Committee on Improvement of Agricultural Statistics set up under the Ministry of Food & Agriculture should look into the various problems involved and that the Directorate of Economics & Statistics in this Ministry should prepare a scheme for type study in one or two selected areas where the difference was wide, to diagnose the causes thereof and suggest measures for reconciliation.

Recommendations

In order to fill the serious gaps in the statistics relating to forestry and to improve the quality and range of the existing statistics, the Group made the following recommendations :

1. Full-fledged Statistical Units under competent, qualified statisticians should be set up in Forest Department in each State.
2. Similar Statistical Cell should be set up under the concerned Adviser in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.
3. The Statistical Organisations at the Centre should conduct pilot surveys and studies to develop suitable methodology for collection of data to fill important para in forestry statistics and once that was done the State should be encouraged to take over the collection of these data as a normal routine and their work should be coordinated by the Statistical Cell at the Centre.
4. The Standing Committee on Improvement of Agricultural Statistics set up in the Ministry of Food & Agriculture should look into the various problems connected with reconciliation of discrepancies between the two sets of figures of area under forests, and the Directorate of Economics & Statistics in the Ministry should take up pilot studies in one or two selected areas to diagnose the causes thereof and to suggest measures for reconciliation.

Financial Provision

The cost on account of implementation of the various recommendations of the Group during the Fourth Plan period and for advance action during 1964-65 or 1965-66 was estimated as follows :

Sche	(Rs. in lakhs)	
	Financial provision for the 4th Plan Period	Financial provision for advance action during 1964-65 or 1965-66
Creation of Statistical Cells in State Departments of Forestry . .	20.00	4.00
Creation of Statistical Cells at the Centre for Forestry Statistics	4.00	0.80

IMPROVEMENTS IN FISHERIES STATISTICS

Summary of the Note Received (DES-12)

From the time of the publication of the Report of the Technical Committee on Coordination of Fisheries Statistics set up by the Ministry of Food & Agriculture in 1950, some attempts have been made towards collection and coordination of fisheries statistics in the country, but the progress seems to be very poor. Under the Five Year Plans, much emphasis has been laid on the development of fisheries and large provisions have been made for the purpose, but reliable data are not available even for an overall assessment of the progress of the fisheries schemes.

The statistics of marine fish catches are at present collected by the Central Marine Fisheries Research Institute, Mandapam through sample surveys on the lines of the technique developed by I.A.R.S. through pilot investigations carried out during 1950–56. The statistics collected at present include data on total fish catch of individual species, hours of absence of fishing units from the shore, number of crew in a unit, etc. The coverage of these surveys needs to be extended to other items.

The inland fisheries statistics are collected by the Central Inland Fisheries Research Institute, Barrackpore. Data are collected for the rivers of Ganges, Narbada, Tapti, Godavari and Krishna and also for Matla-Mahanadi estuaries and Chilka Lake. To arrive at the all-India estimate of inland fish catch, the scope of the work of the Institute needs to be expanded to cover all rivers. Some fisheries statistics are also collected by individual States but much needs to be done to improve their coverage and reliability. The NSS directorate has also conducted a sample survey on fresh water fish in Orissa.

In order to fill the gaps in the basic fisheries statistics required for purposes of national income estimation and planning, the Technical Committee on Coordination of Fisheries Statistics, 1950, recommended the following programme of work :

Data to be obtained by complete enumeration—

(a) Once in five years—

Water resources—nature, number, area and exploitation;

Families and population engaged wholly or partially in any branch of fish industry;

Fishing crafts and tackles, and fish transport vessels;

Numbers of curing yards, fish farms, ware-houses, ice-plants, refrigeration and transport equipment; and

Sources of supply of spawn, fry and fingerlings;

(b) At shorter intervals—

Arrivals at selected markets (daily);

Internal trade :

Output of processed fish and fish products, such as fish liver oil, fish oil, fish meal and fish manure (annual);

Data on spawn, fry, fingerling and fish collected, reared, and dispersed off by inland fish farms under Government or quasi-Government management and large commercial farms (annual); and

Landings, wholesale and retail prices of fish at selected centres of production and consumption (weekly).

2. Data to be obtained through periodical sample surveys—**(a) Once in 5 or 10 years, conducted on an intensive basis—**

Extent of exploitation of different classes of fisheries;

Sources of supply of gear, yarn, nets and crafts and other materials required for fishing;

Efficiency of different fishing practices;

Efficiency of different types of craft and gear;

The marketing, storage, transport and refrigeration facilities;

The economics of fish industries, manufactured fish products and bye-products.

Sources of supply of finance and indebtedness of fishermen;

Consumption of fish by fishermen and non-fishermen;

Economic and sociological conditions of population engaged in fishing and allied industries.

3. Data to be obtained through continuous sample surveys—

Catches of inland and marine fish.

4. Data requiring controlled experiments and observations over a long period—

Data on biological factors.

In order to place the fisheries statistics in the country on a sound footing, the programme of work recommended by the Technical Committee needs to be implemented. In view of increasing tempo of fishery development and exploitation, there is an increasing demand for fresh types of data relating to fishery. It is necessary that the methodology developed by the IARS should be implemented in all the maritime States to obtain the estimate of fish production. Surveys for estimating inland and fresh water fish production also need to be conducted in all the States. Therefore, it is necessary that the State Fisheries Departments should have permanent Statistical Units to initiate and analyse the data of such surveys both on marine and inland fisheries and also to help the research workers in fisheries in designing their breeding programmes, etc. To start with during the Fourth Plan, it is suggested that a small unit of 1 statistician, 2 statistical assistants and 4 computers may be set up in the Department of Fisheries in each State.

A Statistical Cell at the Centre is also needed to guide and coordinate the activities of the Statistical Cells in the States. A large number of

administrative reports, statistical reports and progress reports are received by the Fisheries Development Adviser from the States in connection with the implementation of the various Central and State fishery development schemes. These reports need to be scrutinised and the progress assessed from time to time with a view to removing the bottlenecks. There will be considerable advantage both from operational and technical angles if this Cell is located in an Organisation which is equipped with the technical knowledge of fishery and is concerned with the day-to-day administration and execution of fishery development programmes. The proposed Cell may, therefore, be located under the Fisheries Development Adviser, Ministry of Food & Agriculture. In addition to organising the collection of fisheries statistics as per the recommendations of the Technical Committee, this Cell may examine the sample survey techniques followed by CMFRS, Mandapam and CIFRS, Barrackpore from the point of adequacy of sample size, errors of estimation, availability of estimates for smaller regions. The Cell may bring out two regular publications, one on marine fisheries and the other on inland fisheries. It will further examine the quarterly progress reports on fishery indicating physical and financial progress and also shortfalls.

Summary of Discussion

The Group noted the serious gaps in fishery statistics with regard to both regular and Plan statistics, and emphasised the need for collection, coordination and publication of these statistics. The Group appreciated the need for the creation of a suitable Statistical Unit either directly in the E. & S. Directorate or as an affiliated unit of the Directorate under the Adviser for Fishery Development. This unit would also advise the States on the types of the data and the frequency with which that should be collected.

In view of the urgent need to fill the serious gaps in fishery statistics both at the State and Central levels, the importance of establishment of statistical units in the State Departments of Fishery was fully appreciated. It was decided that the question of setting up these Statistical Cells should be pursued vigorously and advance action should be taken in the Third Plan itself.

The Group was informed that the results of the surveys conducted by the Directorate of NSS on fresh water fish in Orissa were likely to be available shortly. As the types of fresh water sources and methods of catching fish were likely to differ from State to State, it was proposed to conduct similar pilot surveys in other States to evolve the sampling technique to estimate fresh water fish production. The Working Group was also informed that an Inter-Departmental Committee to coordinate the fisheries statistics was being set up. It was observed that the proper approach would be to develop suitable sampling technique through pilot investigations by Central Organisations and once that was done the States should be encouraged to take over the surveys and their work should be co-ordinated by the Statistical Cell proposed to be set up under the Fisheries Development Adviser. In order to enable the States to take up this work, the need for creation and strengthening of Statistical Cells in the State Fisheries Departments was further emphasised. It was desired that the NSS directorate might accelerate the work relating to the evolution of the

technique for the estimation of catch of inland fish. As regards co-ordination, it was felt that this could be usefully exercised by the Statistical Cell to be set up under the Fishery Development Adviser in the Ministry of Food & Agriculture and not by inter-departmental Technical Committee.

Recommendations

In order to fill the serious gaps in the statistics relating to fishery and to improve the quality and range of the existing statistics, the Group made the following recommendations :

1. Full-fledged Statistical Units under competent, qualified statisticians should be set up in the Fishery Department in each State.
2. Similar Statistical Cell should be set up under the concerned Adviser in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.
3. The surveys conducted by the Central Marine Fisheries Research Institute, Mandapam, and the Central Inland Fisheries Research Institute, Barrackpore, for estimation of marine and inland fisheries production, should be suitably guided and coordinated by the Statistical Cell to be set up under the Fisheries Development Adviser in the Ministry of Food & Agriculture.
4. As regards fresh water fishery, the NSS should extend the pilot surveys already being conducted in Orissa to other areas to evolve suitable sampling technique for estimation of fresh water fish production.
5. The Statistical Organisations at the Centre should conduct pilot surveys to develop suitable sampling techniques and once that was done the State should be encouraged to take over the statistical surveys and their work should be coordinated by the Statistical Cell at the Centre.

Financial Provisions

The cost on account of implementation of the various recommendations of the Group during the Fourth Plan period and for advance action during 1964-65 or 1965-66 was estimated as follows :

Scheme	(Rs. in lakhs)	
	Financial provision for the 4th Plan period	Financial provision for advance action during 1964-65 or 1965-66
Creation of Statistical Cells in State Departments of Fisheries	20.00	4.00
Creation of Statistical Cell at the Centre for Fisheries Statistics	3.00	0.60
Pilot Surveys for Fresh Water Fishery	8.00	--

CHAPTER XVII

RESEARCH INVESTIGATIONS

STUDY OF THE IMPACT OF MILK SUPPLY SCHEMES ON RURAL MILK COLLECTION CENTRES

Summary of the Notes Received (IARS-6 and DES-10)

In the Five Year Plans a number of milk supply centres are being established. As a result of these schemes, the producers in rural areas from where milk would be collected, would get an incentive for improvement in both quality and quantity of milk production and there would be general improvement in their economic status. In order to assess the impact of city milk schemes on rural areas, it is proposed to collect information on various aspects such as milk production, quantity and composition of feed given to animals, changes in number of milch animals, breed and age composition of animals, cropping pattern, attention paid to fodder production, assets and equipment connected with dairying, receptivity to adoption of improved animal husbandry practices, consumption and utilisation of milk both in producer and non-producer households, economic status of the producers, etc.

In each area under study, the survey will be carried out periodically starting with a bench-mark survey prior to the commencement of rural milk collection. For this reason, in selecting the milk supply schemes for study, preference will be given to those schemes which have just started or are about to start. Some schemes already in operation may also be taken up. A field staff of trained enumerators under proper supervisory staff headed by a field officer who is qualified in dairying, will be entrusted with the task of collection of data according to a prescribed sampling plan. To begin with, a complete household enumeration of animals will be carried out in a representative set of villages. Each selected village will be visited for two days every month in the year and at each visit random samples of producer households, from among those supplying milk to the scheme as well as from those not supplying milk, will be selected for recording detailed data on the various items. Data on milk yield and feed will be collected by direct weighment and other information through careful enquiry. A random sample of non-producer households will also be selected, for enquiry into the consumption and utilisation of milk. Data will be collected on the same pattern from a random sample of villages in a suitable 'control' area having similar agro-biological conditions as the milk collection area, but not supplying milk to any scheme. An enumerator, who will have a jurisdiction over ten villages, will collect the data in the schedules prepared for the purpose. A staff of relieving enumerator-cum-supervisors and inspectors will be provided under the field officer for intensive supervision of the field work. At the centre, a statistician with the necessary computational staff will help in drawing up details of the plan and proper schedules. He will train the field staff, guide the scrutiny, compilation and analysis of the data collected and prepare the report.

One complement of field staff may cover within a period of 14 to 15 months either a big milk supply scheme (with a capacity of handling 1,500 mds. or more of milk per day) or two schemes, one medium and other small (with capacities of 500 to 1,500 mds. and up to 500 mds. of milk per day respectively). Thus during the Fourth Five Year Plan period, it will be possible to complete one round each of eight schemes of medium and small types. If, however, a repeat enquiry is sought within a period of five years, as may be considered desirable since rapid changes are likely within two or three years of commencement of milk schemes, it will be possible to undertake two rounds of enquiry for four milk schemes of medium and small types. The number will be less if large milk schemes are also included.

These pilot enquiries by the IARS will be aimed at developing a suitable method for carrying out such studies. Once the technique is developed, the studies could be taken up as a routine periodically in all the important milk supply schemes by the Statistical Cells to be established in the State Dairy Development Departments. Although the main scheme is to be included in the Fourth Plan, it is proposed to start the study in one or two centres in the remaining years of the Third Five Year Plan itself so as to gain experience in the planning of the project and the handling of problems arising in conducting the enquiry.

SAMPLE SURVEYS ON FERTILIZER AND OTHER MANURING PRACTICES

The IACR is carrying out sample surveys on fertilizer and other manuring practices in selected districts in different States. The broad objectives of these surveys are to estimate crop-wise the consumption of different fertilizers and manures, areas benefited therefrom, rates of application, types of farmers using fertilizers, associated cultural practices, etc. In each selected district, about 800 cultivators are selected randomly and are contacted to obtain information on crops grown, fertilizers and manures applied, source of procurement of fertilizers, time and method of their application, irrigation and its source, seed rate, variety of seed, preparatory and intercultural operations, etc.

During the first and second Five Year Plan periods, the surveys were conducted by the ICAR out of its own funds in seven districts. In the Third Five Year Plan, it is intended to repeat the surveys in the same districts after a lapse of five years or so in order to study the change in the extent and pattern of fertilizers consumption and also to conduct fresh surveys in more districts. In all, surveys in about 19 districts are envisaged to be conducted during the Third Five Year Plan period.

During the Fourth Plan period it is proposed to conduct these surveys in the same districts covered during the Third Plan period. In addition, it is also proposed to cover a few more districts. Thus in all, surveys in about 25 districts will be conducted.

ESTIMATION OF INCIDENCE OF PESTS AND DISEASES

Crop pests and diseases cause large damage to agricultural production, reliable quantitative estimates of which are not available. In order to take effective and economic control measures, information on these incidences is essential. As a first step towards collecting necessary

data in this regard, the Institute of Agricultural Research Statistics launched a pilot survey by the random sampling technique in Cuttack district (Orissa) on rice crop in 1959. The survey on rice was extended to Thanjavur (Madras) and West Godavari (Andhra Pradesh) in 1962-63. Each survey was scheduled to last for a period of 3 years.

Each district was sub-divided into a number of zones which constituted the strata. In each zone, 6 villages and in each village 6 fields were selected at random. Of the 6 fields, observations were made on all of them while control measures were adopted in only 2 of them. In each field 4 non-overlapping sampling units, one square metre each, were selected. Sampling observations were taken on all fields including those where control measures were adopted.

The survey on wheat and maize crops has recently been started in Aligarh district of Uttar Pradesh. It is proposed to conduct such pilot sampling investigations on two more crops, *viz.* sugarcane and jowar. Thus from now on, there will be in all 5 districts under survey till the end of the Third Five Year Plan.

Based on the experience gained from the survey on the most important food crop, namely rice, it is proposed to conduct during the Fourth Plan an all-India survey on this crop covering 11 States. The total number of tehsils to be covered will be of the order of 150. In the States where a single crop of rice is taken, the survey will also cover the important winter cereal which, in most cases, will be wheat. Pilot surveys will also be initiated on some of the other crops like jowar, sugarcane, maize, cotton and potato. The losses due to incidence of pests and diseases on these crops will be estimated on a pilot basis.

The surveys will be conducted by the State Governments under the technical guidance of the Institute of Agricultural Research Statistics (IARS). The programme for the all-India survey on rice will be planned by the IARS in collaboration with the Heads of Divisions of Entomology and Mycology of the Indian Agricultural Research Institute (IARI). The IARS will also be responsible for the statistical analysis and reparation of the reports.

ESTIMATION OF COST OF CULTIVATION OF RICE, WHEAT, OILSEEDS, ETC.

The cost of cultivation surveys have been found useful for guiding agricultural price policy as well as planning. During the Third Five Year Plan cost of cultivation surveys have already been conducted on cotton, oilseeds and important cereal crops in cotton producing areas. Paddy and jute will be covered in important jute areas by the end of this Plan. Pilot surveys have been undertaken in respect of arcanut and coconut. However, quite a number of important crops remain to be covered. It is necessary to undertake the surveys on these crops during the Fourth Plan. The crops that need to be covered are rice in Eastern Uttar Pradesh, Bihar, Orissa, East Madhya Pradesh, Andhra Pradesh, Madras and Kerala; wheat in Uttar Pradesh and Western Madhya Pradesh, rape and mustard in Uttar Pradesh and groundnut and castor in Andhra Pradesh and Madras. Surveys on sugarcane conducted by the Indian Central Sugarcane Committee were completed in the most

important sugarcane growing States before the end of the Second Five Year Plan and it is necessary to repeat the surveys in these areas during the Fourth Plan. It would obviously be economical to cover more than one crop in the same survey wherever possible. The following zones might, therefore, be selected for study of cost of cultivation of crops during the Fourth Five Year Plan :

Zone	Crops
1. Uttar Pradesh and West Madhya Pradesh.	Wheat, gram, maize, and rape and mustard.
2. Bihar, Orissa, Eastern Uttar Pradesh and Eastern Madhya Pradesh.	Paddy, maize, wheat and barley.
3. Andhra Pradesh, Madras and Kerala.	Paddy, groundnut and castor.
4. Punjab and West U.P. and Central U.P.	Sugarcane and Wheat.

Other important crops in the four zones might also be studied to the extent possible.

In view of the extensive areas covered, at least 50 villages might be selected for enquiry in each zone. As regards duration it will be necessary to cover at least three crop seasons to take account of seasonal variations and consequently the surveys will cover about four calendar years.

ESTIMATION OF COST OF PRODUCTION OF MILK

The Institute of Agricultural Research Statistics carried out large-scale random sampling enquiries for estimating the cost of production of milk in the urban and rural areas in Delhi State (1953-55), Madras (1957-59) and Calcutta (1960-62). As a result of these efforts a satisfactory technique for estimating the cost of production and its components and for studying the economics of milk production has been developed. It was recommended while formulating the Third Five Year Plan that such enquiries might be taken up in about 10 important centres, particularly those around important milk supply schemes during the Third Five Year Plan. But it is only in Mysore State that a study of this type for estimating the availability and cost of milk production in the areas around Bangalore City has been taken up so far. It would be useful if such enquiries are carried out in a few centres in the Fourth Five Year Plan. As will be evident from the reports on surveys already carried out, these enquiries not only provide objective estimates of the cost of production but throw up a fund of information useful to the planner in promoting economic and efficient milk production.

COORDINATION OF COST OF PRODUCTION STUDIES

Data on cost of production of various agricultural commodities have become available through the cost of production surveys conducted by the Commodity Committees of I.C.A.R. (like Indian Central Cotton Committee, Indian Central Oilseeds Committee and Indian Central Jute Committee) and the Farm Management Studies conducted by the Directorate

of Economics & Statistics. The cost of production studies of the Commodity Committees have mainly provided data on cost of production of cash crops like sugarcane, cotton and groundnut. The Farm Management Studies have provided data on cost of production of major foodgrains like rice, wheat, jowar and gram and also of some cash crops like sugarcane, cotton and groundnut. These studies have in addition provided data on various other aspects of farm management which can be useful for formulation of governmental policy and also for extension purposes.

The cost of production studies of the Commodity Committee are more broad-based covering the crop tracts in different States, whereas the farm management studies are confined to a few districts in each State covering the major soil-crop complex in the region. The question of extension of farm management studies to new regions during the Fourth Plan is being considered by the Working Group on Agro-Economic Research and Farm Management Studies. The desirability of extending cost of production studies covering the main producing areas with reference to certain crops not adequately covered so far like rice, wheat, etc. needs consideration. The extension of cost of production studies and farm management studies during Fourth Plan may be planned in such a way that the districts to be covered in the farm management studies are not covered by the cost of production studies and *vice versa*.

7. National Index of Field Experiments

A vast amount of experimentation on problems relating to agricultural research is being conducted at Research Institutes and other experimental centres functioning under the State Departments of Agriculture, Commodity Committees, etc. The results of these experiments lie scattered in the files and records at research stations and in the Departments of Agriculture and as such are not easily available to agricultural research workers. The absence of a unified record of the results of these various experiments has, in the past, considerably impeded planning of further research and development and has often led to duplication of efforts. In order to consolidate the results of the experiments conducted by various agencies, the Indian Council of Agricultural Research launched the scheme of National Index of Field Experiments in 1955. Under the scheme, results of all agricultural field experiments other than purely varietal trials were to be consolidated. Subsequently at the time of the extension of the scheme in 1959 it was decided that a compendium should be prepared in the first instance for the period 1948-53 and a similar compendium for the period 1954-59.

The data of the experiments are collected by the regional staff of the Council placed in 14 regions of the country under the supervision of regional supervisors who are the Directors of Agriculture, Statisticians or Principals of some Agricultural Colleges. All the available data, comprising about 22,000 experiments conducted during the period 1948-59 have so far been collected by the regional staff of the Council. The compendium of the experiments conducted during the period 1948-53 has been prepared by the Council in 15 volumes, one for each State and one for the Central Institutes. The printing of the second part of the compendium, namely for the period 1954-59 is in progress. This publication

has proved of immense value in planning further agricultural experiments and in formulating the yardsticks for increase in agricultural production.

The collection on the existing pattern of the data of the experiments conducted from 1960 onwards is already in progress and it is proposed to be continued during the Fourth Five Year Plan. However, during the recent years there has been a considerable increase in the experimentation on agricultural problems. It is expected that the results of about 20,000 experiments would be available for the period 1960 to 1965 which are to be collected for inclusion in the next series of the compendium. The data of the experiments so far collected are being critically examined for preparation of suitable summaries on different topics under diverse soil and agroclimatic conditions prevailing in the country.

Judging from the utility of the National Index of Field Experiments in the agricultural field, as a permanent unified source of information on various agronomic factors, it is proposed to extend during the Fourth Five Year Plan the scope of the scheme to the field of Animal Husbandry and prepare an Index of Animal Husbandry Experiments for the benefit of research workers in this field. There are at present about 80 stations in the country conducting research on problems relating to animal husbandry. It is proposed to collect, in the first instance, the data of the experiments conducted prior to 1962 for indexing. The data for the subsequent years will be collected after the index for this period has been prepared. From the above, it is evident that the work in the scheme will be considerably increased during the next five years both in the regions and at the headquarters. The existing staff in the region will have to be adequately strengthened from next year onwards and they will have to be given adequate training to handle the work in their respective regions. Simultaneously the staff at the Headquarters will also have to be suitably strengthened so as to be able to handle all the work of the scheme. The augmented staff under the scheme during the Fourth Five Year Plan will, therefore, consist of a regional staff of 25 Statistical Assistants and 21 Senior Computers and Headquarters Staff of 1 Senior Statistician, 1 Statistician, 3 Statistical Investigators, 5 Statistical Assistants and 3 Senior Computers. The Scheme would cost Rs. 13 lakhs during the year 1966-67 to 1970-71 on the staff and the printing of the compendium for the period 1960-65.

Summary of Discussion

It was felt that items like economics of mechanised fishing, studies of factors responsible for changes in cropping pattern, etc. should also be taken up for research investigations. A suggestion was made that as these research investigations appeared to be sort of evaluation studies, they could be conducted at periodic intervals. It was then pointed out that those interested in dairy development wanted the study for assessment of impact of milk supply schemes on rural collection centres to be conducted at shorter intervals. The studies relating to fertilizer and other manurial practices would also need to be repeated in the districts already covered in the Third Plan in addition to covering some new districts. The studies on incidence of crop pests and diseases and damage done by them would be continued, and a country-wide survey for assessing incidence of pests

and diseases on rice and consequent loss on yields would be undertaken in the Fourth Plan. As regards cost of production studies, it was felt that the surveys required careful consideration and that the studies at present being conducted by Commodities Committees and also under Farm Management enquiries needed to be coordinated. The question of cost of production studies was also said to be under the consideration of the Working Group on Price Incentives and Subsidies and also Technical Committee on Farm Management Investigation. In addition to cost of production surveys, the need for family budget surveys for the farmers and cost of marketing surveys was also emphasised. It was felt that they could be conducted on the sample of households selected for the cost of production survey. The cost of production surveys were considered necessary for rice, wheat, jowar, cotton, jute, sugarcane, tobacco and groundnut in the different regions of the country.

Alongwith the surveys on cost of production of milk, the need for pilot surveys on poultry in areas like Gurdaspur where modern poultry farms were said to have been developed, was stressed. It was decided that surveys might be taken up in one or two areas like Gurdaspur where poultry development has made some headway on organised lines.

Tabulation of data available from farm management studies on cost of cultivation according to scale of operation, i.e., holding-sizes was also recommended so as to analyse the economics of scale. The usefulness of analysing these data to locate the peak period of demand for labour was stressed, as such analysis could indicate the possibility of adopting selective mechanisation at such peaks for reducing cost.

With regard to incidence of pests and diseases on crops, it was pointed out that two points were involved; one was the location of outbreak of pests and diseases and the assessment of their incidence and the other related to assessment of the loss in yield and the effectiveness of control measures taken. The pilot surveys undertaken at present by the IARS were confined to assessment of incidence of pests and diseases and consequent crop losses in a few districts only. There was no attempt at forecasting outbreak of disease and pest incidence. It was observed that the Plant Protection Adviser had a scheme which aimed at collecting the necessary data for forecasting the outbreak of pests and diseases and issuing timely warning to the farmers and also at assessment of incidence of pests and diseases and crop losses on the basis of certain yardsticks developed through studies in foreign countries. It was added that the services of plant protection staff of about 350 persons would be utilised on part-time basis for collection of the necessary data, and the details of the scheme would be worked out in consultation with statistical Adviser, I.C.A.R. and the Heads of the Divisions of Entomology and Pathology of the Indian Agricultural Research Institute after taking into account the method adopted and results obtained in the IARS pilot surveys. The Working Group appreciated the need for collecting necessary data for forecasting outbreak of crop pests and diseases and issuing warning to the farmers and recommended that while the scheme proposed by the Plant Protection Adviser should be implemented, the incidence of crop pests and diseases could be assessed objectively through the type of surveys carried out by IARS, and this would provide a scientific basis for developing the forecasting and warning service proposed to be initiated by the Plant Protection Adviser.

Recommendations

In the light of the suggestions made in the notes considered and the discussions held, the Working Group made the following recommendations :

1. Research investigations relating to (a) sample surveys on fertilizer and other manuring practices, (b) estimation of incidence of pests and diseases, (c) estimation of cost of cultivation of crops and (d) estimation of cost of production of milk, should be continued during the Fourth Five Year Plan according to the programme suggested by the Institute of Agricultural Research Statistics.
2. Research investigations relating to the study of the impact of milk supply schemes on rural milk collection centres, and pilot surveys on cost of production of poultry, in one or two areas like Gurdaspur where poultry development has made some headway on organised lines, should be taken up in the Fourth Five Year Plan in accordance with the IARS proposals.
3. Advance action should be taken in the Third Plan itself so as to evolve suitable sampling techniques for taking up of the surveys for the study of the impact of milk supply schemes on rural milk collection centres and the cost of production of poultry on an appropriate scale during the Fourth Plan.
4. The scope and desirability of extending the research investigations to other items like economics of mechanised fishing, studies of factors responsible for changes in cropping pattern etc. should be examined.
5. The cost of cultivation surveys should cover rice, wheat, jowar, cotton, jute, sugarcane, tobacco and groundnut in the different regions of the country.
6. The family budget surveys of the farmers and the cost of marketing surveys could be conducted on the sample of household selected for the cost of production surveys.
7. The extension of cost of production studies and farm management studies during the Fourth Plan should be planned in such a way that the districts to be covered in the farm management studies are not covered by the cost of production studies and *vice versa*.
8. The data on cost of cultivation of crops available from the farm management studies should be tabulated according to scale of pattern, i.e., holding-sizes so as to analyse the economics of scale.
9. The data provided by the farm management studies should also be analysed with a view to locating the peak period of demand for labour so as to indicate the possibility of adopting selective mechanisation at such peaks for reducing costs.
10. While the scheme prepared by the Plant Protection Adviser for collecting necessary data for forecasting outbreak of crop pests and diseases and issuing warning to the farmers should be implemented, the incidence of crop pests and diseases will have to be

assessed objectively through the type of surveys carried out by the Institute of Agricultural Research Statistics. The IARS surveys would further provide a scientific basis for developing the forecasting and warning services proposed to be initiated by the Plant Protection Adviser.

Financial Provision

The following financial provisions for the various research investigations were recommended :

(Rs. in lakhs)

Scheme	Estimated expenditure during the Fourth Plan Period	Proposed provision for 1964-65 for advance action
1	2	3
Impact of milk supply schemes on rural milk collection centres	8.00	1.44
Sample survey on fertilizer and other manuring practices	5.30	—
Estimation of incidence of pests and diseases	60.00	—
Estimation of cost of cultivation of crops	20.00	—
Estimation cost of production of milk	30.00	—
Cost of production of poultry	4.00	0.72

CROP AND CATTLE INSURANCE**Summary of the Note Received (IARS-7)**

The question of introducing Crop and Cattle Insurance in the country has been under the consideration of the Government of India since 1947. Pilot schemes on Crop and Cattle Insurances were prepared in 1949 by an Officer on Special Duty appointed for the purpose in the Ministry of Food and Agriculture.

The pilot scheme for crop insurance was thoroughly examined by experts in insurance, agriculture and cooperation and also by the F.A.O. Working Party on Crop and Cattle Insurance. The scheme was found workable and its implementation was recommended.

The broad features of this pilot scheme were laid down as follows :

- (a) The scheme will be implemented in selected States and will cover a few major crops.
- (b) In each selected State, the Scheme will be confined to a few centres, each centre comprising about hundred villages.
- (c) Insurance will cover all risks such as drought, floods, hail, which are beyond the control of cultivators.
- (d) In the selected areas insurance will be on a compulsory basis so as to avoid selectivity.
- (e) The scheme will be fully administered by the Government.

On account of financial stringency, it has not been possible to initiate the pilot scheme on crop insurance in any State except Punjab. Only the Punjab Government have included in their Third Plan a scheme for implementation on a pilot basis in some selected areas of the State. It has been decided that 50 per cent of the administrative cost under the pilot scheme will be borne by the Central Government. It is expected that the scheme in Punjab will be continued in the Fourth Plan and some more States will also take up the scheme.

As the scheme envisages compulsory participation of all farmers in the selected areas, a legislation is deemed essential, and a crop Insurance Bill is under the consideration of the Government of India.

Cattle Insurance

Like crop insurance, cattle insurance provides numerous benefits to the farmers such as protection of the farmers against sudden loss of their cattle which form the major part of their working capital, promotion of agricultural prosperity by improving the health and efficiency of cattle and stimulation of breeding and dairying industries.

The pilot scheme on cattle insurance prepared by the Office on Special Duty in the Ministry of Agriculture in 1949 was considered by experts on Animal Husbandry, Insurance and Cooperation and also by the Working Party on Crop and Cattle Insurance of the F.A.O. The

experts were of the opinion that before a full-scale Cattle Insurance Scheme was introduced in the country a beginning should be made on a limited but an adequate scale in selected areas where there was likely to be good response from the cattle owners. Such a beginning must necessarily take the form of a research pilot scheme.

A research pilot scheme was accordingly formulated by the I.C.A.R. and was sent to the different States for implementation. But on account of financial stringency, the scheme could not be started. During the Third Five Year Plan, the scheme is proposed to be started in 8 centres and certain States have included the scheme in their Third Five Year Plan.

The pilot scheme envisages formulation of Cattle Insurance Cooperative Societies each catering to about 20 villages in each State. These societies are supposed to be the primary insurers. There will be three such societies in each of the 8 centres. The administrative personnel to guide the schemes at the State level will be provided by the State Departments of Animal Husbandry. To start with, the insurance will be on a voluntary basis and will be confined to the loss sustained by death of cattle.

In order to coordinate the work of implementation of the scheme in the different States a provision has also been made in the Central Plan for setting up of a small Unit at the I.A.R.I. An *ad-hoc* Committee has also been set up under the chairmanship of the Animal Husbandry commissioner, Government of India, to guide the working of the scheme.

So far the scheme has not been implemented in any State due to National Emergency. The scheme may now be taken up in the Fourth Five Year Plan. Some advance action should, however, be taken in the Third Plan itself so that the scheme may be implemented fully in the Fourth Plan.

Summary of Discussion

It was stated that the scheme for crop insurance was already included in the Third Plan and it was necessary to continue it in the Fourth Plan. As regards cattle insurance, it was observed that a scheme for the purpose was already prepared. Considerable spade work had been done for undertaking it in selected areas. It was further pointed out that the State Animal Husbandry Departments had started Intensive Cattle Development Programme in selected areas on the lines of Intensive Agricultural District Programme and the scheme of Cattle Insurance could be initiated in these areas in the Third Plan itself.

Recommendations

1. The scheme for crop insurance should be taken up in more States during the Fourth Five Year Plan.
- (2) The scheme for cattle insurance should be initiated in those areas which have been selected by the State Animal Husbandry Departments for intensive Cattle Development during the Third Plan itself and should be further extended during the Fourth Plan.

Financial Outlay

The following expenditure was estimated for crop insurance and cattle insurance schemes during the Fourth Plan and for advance action during the Third Plan :—

									(Lakh Rs.)
Scheme								Expenditure during the Fourth Plan ;	Expenditure for advance action in 1964-65 or 65-66
Crop Insurance	..	..	..	..	..	..	..	30·00	—
Cattle Insurance	..	..	..	..	..	..	.. ,	20·00	1·0

CHAPTER XIX

STRENGTHENING OF THE INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS (ICAR)

Summary of the Note Received (IARS-8)

In the course of the past 30 years the work done by the Institute of Agricultural Research Statistics (ICAR) has resulted in a widespread recognition and appreciation of the essential role of statistical methods in agricultural and animal husbandry research and considerable progress has been made in the application of these methods to agricultural research in particular. Animal Husbandry research, because of its peculiar difficulties has not shown equally rapid progress in this regard. However, a beginning has been made during the Third Plan period to make good this short-coming.

Further progress depends largely on action in two directions. Agriculture and animal husbandry research in States is very inadequately served by statistics. The primary necessity is to pursue vigorously the scheme of setting up of suitable statistical units manned by well-qualified and trained personnel in State Departments of Agriculture and Animal Husbandry. This scheme which is included in the Third Plan on the recommendation of the Agricultural Personnel Committee, has not been implemented fully in most of the States, and the much needed statistics for formulating the schemes for agricultural and animal husbandry development during the Fourth Plan, are consequently lacking. Therefore, there is an urgent need to implement this scheme fully during the remaining period of Third Plan and continue it with appropriate expansion during the Fourth Plan period.

Consequent upon the increasing tempo of agricultural and animal husbandry research under the successive Plans, new types of statistical problems are being thrown up. Therefore, the Institute of Agricultural Research Statistics at the centre also needs expansion to tackle the various research problems. To meet the demands of various developmental programmes, the Institute has already initiated several research schemes to evolve suitable methodology for collection of statistics in agriculture and animal husbandry sectors. These schemes need to be continued during the Fourth Plan period and their scope expanded to wider fields and areas. For instance, sample surveys to obtain data on use of fertilizers and other manures by the cultivators will have been conducted in 19 districts by the end of the Third Plan and it is proposed to repeat them during the Fourth Plan for an appraisal of the changes taking place in the manurial practices over time. Besides these surveys are proposed to be extended to another 25 districts during the Fourth Plan. The scheme to estimate the incidence of major pests and diseases and consequent loss in yield which was initiated on rice in the Third Plan needs extension to other important crops such as jowar, maize, wheat, sugarcane, cotton and potatoes. The importance of such types of studies has grown on account of the increasing use of insecticides and fungicides and there is an urgent need to find out their effective and economic use. The Institute has further conducted sample surveys for estimating the area and production of

cashewnut and major spices such as pepper, cashewnuts and cardamom which earn foreign exchange. These surveys need repetition and extension during the Fourth Plan and will require the continuous guidance of IARS. New surveys are proposed to be carried out on ginger, turmeric and chillies which are also important both on account of their local consumption and their export for earning foreign exchange. There is dearth of reliable statistics in respect of production of vegetables and fruits and immediate attention is called for to fill the gaps in this regard to enable formulating of realistic schemes for increasing their production.

The Institute has conducted sample surveys during the Second and Third Plan periods to improve the statistics of livestock products and to collect reliable information on animal husbandry practices in the country. Such surveys have been conducted for estimating annual milk production in the States of Punjab, Uttar Pradesh, Gujarat, Andhra Pradesh and Orissa; for wool production in Gujarat, Rajasthan, Mysore and Himachal Pradesh; and for egg production in Andhra Pradesh, Kerala and West Bengal. It is proposed to cover the other important regions in the remaining period of the Third Plan to have a fair estimate of the production of these important products at the all-India level. It is further proposed to repeat these surveys in the Fourth Plan to assess the changes brought about in the level of production due to various developmental plans. The States will also be urged to undertake such investigations to improve the reliability of their livestock statistics.

With the adoption of Community Development Block as a unit for planning and development, the need for evaluating the performance of these blocks in terms of physical achievements by collecting statistics of production of agricultural crops at the Block-level has assumed great importance. The present scale of crop-cutting experiments at most give fairly precise estimates of production at the district level. The IARS has initiated a pilot scheme in 12 districts during the Third Plan period to develop a suitable methodology for obtaining estimates of agricultural production at Block level and for studying the technical and organisational problems thereof. The results obtained so far have been encouraging, and it is proposed to extend this scheme in the Fourth Plan on a country-wide basis.

Cost of production studies help the Government in its price and development policies. During the Third Five Year Plan a scheme for estimating cost of cultivation of cotton, oilseeds and other rotation crops in principal cotton growing tracts of the country has been implemented. In the Fourth Plan it is intended to have similar studies on rice, wheat and oilseeds. The survey on cost of cultivation of jute which has been initiated by the Indian Central Jute Committee in the Third Five Year Plan will have to be continued in the Fourth Five Year Plan. The survey on cost of cultivation of sugarcane conducted by the Indian Central Sugarcane Committee may have to be repeated during the Fourth Plan, and new areas brought under sugarcane as in Rajasthan, may also be covered by the survey. In order to prepare annual indices of costs of production of crops, it is also proposed to collect information on agricultural wages and prices in areas covered by cost of production studies.

The Institute has also developed a suitable sampling technique for estimation of cost of production of milk in urban and rural areas. The information obtained from such enquiries is extremely useful for planning

and development of milk supply schemes. It is proposed to take up such surveys in about 10 centres in the country during the Fourth Five Year Plan. Similar techniques have been developed for estimation of cost of production of wool and it is proposed to carry out such studies in areas not covered in Third Five Year Plan. Pilot surveys are proposed for estimating cost of poultry and egg production because of the increasing importance being given to poultry development. The urban milk supply schemes depend heavily upon the rural milk collection centres for their efficient working. This in turn will be governed by improvement in feeding, introduction of good breeds, etc. For this purpose it is necessary to collect information on various aspects of milk production, quantity and composition of feeds, etc. and on economic status of people in rural areas. With this object in view a survey is proposed to be conducted to study the impact of milk supply schemes on rural collection centres during the Third Plan and will be continued in the Fourth Plan on a much wider scale. Such studies will considerably help in the proper formulation of urban milk supply schemes.

Till recently research workers in agriculture were very much handicapped by the absence of unified record of experimental experience in the country to serve as a reference and a guide for future experimentation. The Institute has filled this gap by centrally maintaining the results of all agricultural fields experiments conducted in the country on specially prescribed index cards and by printing them in the form of a compendium periodically. So far the data of experiments carried out during 1948-53, numbering about 75,000 have been collected and the compendium in the form of 15 volumes printed by the ICAR. The scheme is to be continued in Fourth Plan period to complete the record for pre-1948 period and to keep the information up-to-date.

It is proposed in the Third Five Year Plan to establish a suitable Biometrical and Operational Research Unit at the Institute. But due to the emergency the unit could not be established. However, some work has been started in this direction in the Third Plan. For example, a beginning has been made in the study of estimation of genetic variability in perennial crops like coconut and mango. During the Fourth Plan it is proposed to organise the biometrical research unit on proper lines to take up some important studies like (1) estimation of mobile populations, in particular, of insects and other pests of field crops, (2) study of spread of diseases and pests in the field crops, (3) study of population dynamics of insects and pests, (4) study of relation between body weight and body measurements for predicting live weight, and (5) study of the relationships between weather and yield and incidence of pests and diseases on crops, etc.

Considerable economic data have been collected by the Institute during the course of several sampling and experimental enquiries in the Third Plan and will be collected in the Fourth Plan. It is proposed to undertake econometric studies on the basis of these data and for this purpose a suitable econometric research section will be set up in the Fourth Plan.

In order to encourage the farmers for investing more in land and livestock to increase agricultural production it is necessary that farmers should be freed from the burden of bearing natural risks involving crop failures and cattle losses. Thus insurance to cover such losses is an essential measure to ensure the full impact to all developmental plans. A scheme

of crop and livestock insurance which is within the reach of the cultivators is proposed to be initiated at an early stage. A pilot scheme of crop insurance is to be initiated in Punjab in the Third Plan and will continue in the Fourth Plan. In the light of the experience gained in Punjab, other States might be covered in the Fourth Plan period. A similar scheme on cattle insurance was proposed to be conducted in some States during the Third Plan but this has been deferred for implementation due to the National Emergency. This scheme should be taken up on a pilot scale in a few centres in the Fourth Plan.

To make maximum use of the data collected in various sampling and experimental enquiries it is necessary that the data should be expeditiously processed and results made available for decision-making. For this purpose, it was planned to expand the mechanical tabulation facilities at the Institute by setting up an electronic computer. The electronic computer would be arriving shortly at the Institute. Existing mechanical tabulation facilities may not be sufficient to meet the increased needs in the Fourth Plan and will need considerable augmentation. IARS should also serve as a training and servicing centre for large scale computations required in agricultural Research and development projects, thus the electronic computing facilities may have also to be augmented in the Fourth Five Year Plan.

With the expanded programme of research both in the States and at the Centre, it is necessary for the IARS to keep a close contact with it and also to coordinate and supervise the statistical schemes sponsored by it in the various regions of the country and to provide facilities of timely statistical advice and rapid analysis of data at the regional level. For this purpose, IARS will have to provide statistical staff at the regional levels, and to carry out this work three Regional Centres are proposed to be set up in the Fourth Plan.

It is proposed to extend training facilities in the Fourth Plan. M.Sc. and Ph.D. courses in agricultural statistics will be initiated in cooperation with IARI.

To keep pace with the agricultural statistical research and training requirements during Fourth Five Year Plan it is proposed to reorganise the Institute into appropriate divisions headed by senior officers. Addition to the present building will also have to be provided for classes, computing laboratory, library and staff, during the Fourth Plan.

Summary of Discussion

It was fully recognised that with the expanded programmes of statistical surveys and research both at the State and Central levels, it was necessary for the IARS to keep a close contact to ensure the development of these programmes on proper lines. The need for proper supervision, guidance and coordination of the various research statistical schemes in the different regions of the country was also emphasised. In order that these objectives are achieved, the strengthening of the IARS as proposed in the agenda note was recommended.

Recommendation

In view of the importance of research work done at the Institute of Agricultural Research Statistics in developing appropriate methodology

and system for improving the range and quality of existing statistics and for obtaining new types of data needed for formulation, execution and assessment of development projects, the Working Group recommended expansion of the research activities of the Institute as laid down in its note.

Financial Outlay

The total expenditure on account of the strengthening of the IARS during the Fourth Plan was estimated at Rs. 20.00 lakhs and that for advance action during the Third Plan at Rs. 2 lakhs.

ESTABLISHMENT OF A PLANNING CELL FOR AGRICULTURE

Summary of the Note Received (DES-14)

The various Working Groups set up in the Ministry of Food & Agriculture for the formulation of the Fourth Five Year Plan, are at present engaged in the study of the problems of development in the different spheres of agriculture, the progress achieved so far, and the proposals envisaged for the Fourth Five Year Plan in the context of the requirement during the next ten years and the potentialities for development during this period. The work of these Working Groups will cease as soon as their reports are finalised. On the other hand, agricultural planning would require continuous attention at technical level in the Ministry of Food & Agriculture.

There are at present large gaps in statistical data needed for agricultural planning. While the different Working Groups no doubt would make recommendations regarding the measures necessary for filling in these gaps, it is necessary to ensure that the requisite data are made available at the earliest possible time. For example, with regard to estimation of the demand for various products, reliable data on several items such as seed, feed and wastage ratios, conversion factors, consumption per unit or adult equivalent, etc. are not available and continuous efforts are necessary to collect them. Information regarding expenditure elasticity of the demand for various products also requires greater study and analysis.

Further, specific studies are also necessary on various items, such as the cost-benefit ratios of different programmes like major and medium irrigation, minor irrigation, fertilizers, improved seeds, etc. so that decisions regarding choice between alternative techniques could be taken on a more rational basis. In such cases, what a Central Organisation could do would be mainly to undertake some sort of pilot studies and then communicate the results to the States so that they could take up similar studies in their respective areas.

The problems of agricultural planning at the block and village levels would also require closer attention and study. Although the States are required to build up the targets of production from below, concrete advice has yet to be given to them as to how the targets are precisely to be worked out.

It is also necessary to make a continuing study of agricultural yardsticks, particularly their extension to the commercial crops. Problems regarding investment needs of the cultivators for various inputs, manpower requirements of different programmes, etc. also require close attention.

The work in the sphere of agricultural planning that is being done by various official and non-official institutions in the country should also be collected and kept in a handy form so as to make it available for purposes of formulation and execution of projects for agricultural development.

For organising the study of these various problems, it is necessary to set up a nucleus Planning Cell. The Cell should be manned by a competent team of officers experienced in the fields of economics, statistics and agriculture. Only such a team could make constant and continuing review of the problems arising in the formulation of the Fourth Five Year Plan. In fact, the cell would take into account all the work done by the Working Groups and follow it up from the point where they leave.

Summary of Discussion

It was observed that the work done so far in this respect in the Directorate of Economics & Statistics in the Ministry of Food and Agriculture which was responsible for planning in Agriculture, mostly related to plan co-ordination. The need for setting up a Planning Cell in the Ministry of Food and Agriculture to undertake certain analytical and methodological studies was emphasised, and it was suggested that advance action should be taken in the Third Plan.

Recommendation

Appreciating the need for the various studies in connection with the formulation and execution of projects for agricultural development, the Group recommended the setting up of a Planning Cell in the Ministry of Food & Agriculture.

Financial Provision

The cost on account of the Planning Cell during the Fourth Five Year Plan was estimated at Rs. 4 lakhs and that for advance action during the Third Plan at Rs. 10,000.

REQUIREMENTS OF TRAINED PERSONNEL, TRAINING AND EQUIPMENT

Summary of the Note Received (IARS-DES-1)

The ways and means of improving agricultural statistics through the implementation of the various programmes relating to statistical research and organisation have been indicated in the preceding chapters. It is needless to state that for proper implementation of the various schemes for improvement of agricultural statistics mentioned earlier suitable organisational machinery will have to be set up. In the absence of well-trained statistical staff supported by appropriate organisation it will be difficult to achieve the targets envisaged in the Fourth Five Year Plan. Many of the statistical schemes in the previous plans were not successfully implemented to a large extent, due to lack of full appreciation of the work involved and lack of competent personnel to handle them. It is hoped that in the Fourth Five Year Plan the past experience will be utilised and deficiencies will be corrected in time.

The setting up of organisation, particularly if it is to be manned by trained personnel, takes time and unless action is taken much in advance, completion of the various statistical projects proposed to be taken up would be delayed. For this reason, advance action has been suggested in the Third Five Year Plan itself for many of the projects to be taken up in the Fourth Plan. In most of the cases advance action relates to creation of suitable organisation consisting of statistical personnel and field staff.

In this chapter an attempt has been made to estimate the requirement of statistical personnel and other field staff needed for the various projects suggested for the Fourth Plan. The recruitment of the staff and filling of the posts will have to be staggered throughout the period of Fourth Five Year Plan as trained personnel cannot be made available all at one particular time.

CATEGORIES OF STAFF REQUIRED

The main categories of staff required will be (a) qualified statistical personnel comprising senior and junior statisticians, statistical assistants and computers for taking appointments in the statistical units to be established in the State Agriculture, Animal Husbandry, Dairy, Forestry, Fishery and Irrigation Departments and professors, lecturers and demonstrators for teaching agricultural statistics in the Agricultural and Veterinary Colleges; (b) Field staff comprising field enumerators, supervisors and field officers, and (c) Staff for undertaking mechanical tabulation work consisting of key-punch-operators and the superior staff.

The statistical staff comprising senior and junior statisticians and the subordinate staff in the respective departments will be responsible for designing agricultural experiments, planning and analysis of data collected in the various survey projects such as crop estimation surveys on food and non-food crops, fruits, vegetables and spices, schemes for

assessment of irrigation benefits, surveys on improved agricultural practices, surveys for estimation of livestock products and research investigations on impact of milk supply schemes on rural economy, sample surveys on fertilizers and manuring practices, estimation of incidence of pests and diseases and losses to crops resulting from them, estimation of cost of cultivation of crops, cost of production of milk and poultry and for carrying out normal statistical activities of the Departments of Agriculture, Animal Husbandry, Dairying, Fisheries and Forestry and statistical work relating to planning required to be done by the Departments concerned. The type of work required under these various schemes would necessarily require advanced training in statistical theory and its application to agriculture and animal husbandry in addition to the knowledge of the subject matter fields.

Similarly, the teaching staff at the Agricultural and Veterinary Colleges would need advanced training in theoretical statistics and its application to agriculture and animal husbandry research. The training needed for senior teaching staff and senior and junior statisticians will be of the same type.

The Senior Statisticians and the Professors of Statistics should necessarily be holders of Post-Graduate Degree in Statistics or Mathematics with specialisation in Agricultural Statistics. The Junior Statisticians and lecturers should have a basic degree in Mathematics or Statistics with training in Agricultural Statistics.

The carrying out of the field work relating to the collection of statistical data in agriculture, animal husbandry, etc. would require two types of field staff. The first type will include the primary reporting and the supervisory land record agencies which need strengthening in view of the increased workload. For this staff a special type of training to collect and compile the data in the land record forms in accordance with uniform concepts and definitions and classification will have to be imparted. For this purpose the existing land record schools in the States will need expansion and reorganisation. The other type of field agency will be the field staff specifically meant for collecting the data in specialised field investigations. For instance, for collecting the data in surveys on fertilizer practices, schemes for estimating incidence of pests and diseases, etc., in the agricultural research field, the staff should be from the Departments of Agriculture who are familiar with the problems under study. The Field Officer in charge of such schemes should necessarily be graduate in agriculture, experienced in the subject matter of such fields of investigation. Similarly such schemes as surveys for estimating livestock production, impact of milk supply schemes, etc. in the Animal Husbandry field would require the staff of the Animal Husbandry or Dairying Departments. The Field Officers incharge of such schemes should necessarily be graduate in Animal Husbandry or Dairying and have experience in undertaking such investigations.

With the increased tempo of statistical work in the Third Five Year Plan and its continuation in the Fourth Five Year Plan the need for mechanical tabulation of data will be more increasingly felt. It is expected that some of the State Departments of Agriculture would establish their own mechanical tabulation units during the Fourth Five Year Plan and simultaneously the expansion of the M.T. Unit at the I.A.R.S. is also envisaged. The Electronic Computer Unit which is being installed at

the I.A.R.S. during the Third Five Year Plan, would also require some additional staff.

ESTIMATE OF REQUIREMENTS OF VARIOUS CATEGORIES OF STAFF

In the various schemes mentioned above and other types of schemes such as strengthening of primary reporting and supervisory land records agencies, setting up of statistical units in the various Departments of Agricultural Sector at the Centre and in the States, strengthening of the I.A.R.S., improvement of price intelligence units at the Centre and in the States and crop and cattle insurance schemes would require various categories of staff detailed above. A rough estimate of staff requirements under the various categories during the Fourth Five Year Plan may be made as follows :

Requirement of Statistical and Field Staff in the Fourth Plan

Department	Statistical Staff				Field Staff				
	Senior Statisticians*	Junior Statisticians†	Statistical Assistants	Computers	Field Officers	Inspectors	Supervisors	Enumerators	Primary reporting and Supervisors agencies
1	2	3	4	5	6	7	8	9	10
<i>At the Centre</i>									
Ministry of Food and Agriculture ..	15	60	62	116	35	15	76	981	---
Directorate of N.S.S ..	2	8	4	4	—	—	196	---	—
TOTAL ..	17	68	66	120	35	15	272	981	—
<i>At the States</i>									
Department of Agriculture	90	300	244	900	14	6	919	1,237	—
Department of Animal Husbandry & Dairying	22	97	133	234	23	84	120	360	—
State Statistical Bureaus	10	58	37	142	—	—	739	514	—
Department of Land Records	15£	9	6	22	—	250	2,764	---	39,400
Department of Forestry	—	16	32	64	—	—	---	---	—
Department of Fisheries	—	16	32	64	—	—	---	---	—
TOTAL ..	137	496	484	1,476	37	340	4,542	2,161	39,400

*Senior Statisticians include Professors also.

†Junior Statisticians include Assistant Professors and Statistical Investigators.

£Land Records Officers for revision of land record forms and manuals for collection of agricultural statistics.

It is envisaged that 15 Mechanical Tabulation Units would be installed in the States, which would require 200 Key Punch Operators and 50 Machine Operators. At the I.A.R.S. for expansion of Mechanical Tabulation Unit and for the Electronic Computer 25 Key Punch Operators and 5 Machine Operators would be required. The Statistical personnel to handle the work of these units is taken into account in the statements above.

TYPE OF TRAINING REQUIRED

For Senior Statistical and Teaching Staff

As already indicated, the senior and junior statisticians in charge of the various types of investigation and the teaching staff in the colleges would require a good grounding in general statistical theory and in addition, specialised training in those branches of statistics which are important in agricultural research. These branches are :

- (a) The design and analysis of experiments.
- (b) The planning of experimental programme and summarisation and interpretation of the results.
- (c) The analysis and interpretation of laboratory data including Bio-assay and general Bio-metric methods.
- (d) The design and analysis of specialised surveys on agriculture and animal husbandry.
- (e) Operational research, econometrics, etc.

The training in these branches of specialisation in agricultural statistics is now being imparted at the I.A.R.S. The scheme for strengthening the I.A.R.S. envisages the expansion of the training facilities at the Institute to meet the demands for training the Agricultural Statisticians proposed to be drafted during the Fourth Five Year Plan.

The statistical assistants should have some general statistical training and a short intensive course in statistical methodology. Computers will have to receive training in their normal day-to-day work from their statisticians and statistical assistants during the course of their work.

For Field Staff

As already mentioned the two categories of field staff namely, the primary and supervisory land records agencies, and the special *ad-hoc* staff for the various investigations require different types of training to undertake the tasks entrusted to them.

Arrangements are already existing in the various States to train the primary and supervisory land record agencies. Such arrangements should be strengthened and the training reoriented to give an added stress on the new concepts used in agricultural statistics and methods of collecting them.

The field staff who are to be specially recruited from the respective departments for undertaking the field-work of various investigations should be conversant with the subject matter under study and should be adequately trained in the methods of collecting data before they are put in the field.

EQUIPMENT AND COST THEREON

The equipment required for carrying out the necessary surveys and other investigations and the probable estimate of the cost involved in their purchase are indicated below :

- (a) Survey and map equipment for primary and supervisory agencies. For the entire country the cost on this would be of the order of Rs. 30 lakhs.
- (b) Crop-cutting equipment for location, demarcation and harvesting of plots and processing of the produce. The cost would be of the order of Rs. 10 lakhs.
- (c) Fifteen Mechanical Tabulators to be installed in States, the cost on which would be of the order of Rs. 13.5 million.
- (d) Calculating machines.—Each major State should be provided with 70 calculating machines and thus for the entire country about 1,250 calculating machines would be required. The expenditure on these would be of the order of Rs. 15 lakhs.

AGRICULTURAL STATISTICS IN THE LONG-RANGE PERSPECTIVE

Summary of the Note Received (DES-15)

The process of improvement in agricultural statistics like that in statistics of other sectors, is a continuing one. The planning for agricultural development is handicapped for want of comprehensive and reliable data. Certain gaps in the existing data are noticed, the coverage is found inadequate, quality defective, comparability lacking and time-lag too wide. The need for removing these defects and for collecting new data required for planning is keenly felt. Further, as a development programme progresses, fresh data are required for assessment and evaluation of the programme and for formulation of measures to tide over operational difficulties. With the growth of economy as a result of development measures, new problems of formulation and execution of projects for a more intensified and diversified development, crop up. Further improvement in the range, quality and content of data is called for; some revision in the concepts and definitions and classification adopted becomes necessary to meet the new situations; new types of data with regard to both old and new enterprises are required. Timeliness in availability of data for planning purposes assumes added importance as the pace of development is accelerated. Thus in the process of improvement in agricultural statistics every stage is very important; different measures for improvement have to follow a definite sequence. Postponement of improvements needed in a particular period not only jeopardises further advancement with regard to the data needed for planning but also impedes the very process of planning.

Viewed against this background, it would be desirable first to chart out the improvements in agricultural statistics which have been delayed for one reason or the other, with the result that it has been difficult to formulate the projects for agricultural development in the manner and according to the technique advocated under the successive Five Year Plans and further improvements in agricultural statistics have become difficult to achieve in the absence of a foundation which the earlier improvements should have laid down. These improvements are over due and unless immediate measures are taken to effect them, much improvement in planning techniques in the Fourth Plan cannot be hoped for.

The first and foremost amongst these improvements is the accurate and timely maintenance of land records which are the source of all area statistics and other data needed for formulation and execution of land reform and other development measures in the country. The forms in which the land records are maintained, also need revision to enable collection of area statistics in the different States according to uniform concepts and definitions and standardised classification. The Standing Committee on Improvement of Agricultural Statistics (1961) set up in the Ministry of Food & Agriculture has so far suggested revisions in the basic and abstract land record forms for the collection of agricultural statistics in the States of Andhra Pradesh, Assam, Bihar, Gujarat, Maharashtra, Madhya Pradesh, Madras, Mysore, Punjab (including Himachal Pradesh

and Delhi), Rajasthan and Uttar Pradesh with a view to ensuring uniformity and inter-State comparability. All the States have accepted in principle the recommendations made by the Committee in this regard. The States of Bihar, Madhya Pradesh, Mysore, Punjab and Uttar Pradesh have already introduced the revised forms. Further all the States have been requested to draw up a phased programme for adoption of standard forms and training of the field and supervisory staff for making them conversant with the revised forms. Preparation of detailed records by complete enumeration is also necessary in those tracts where the area statistics are built up through sample surveys or on *ad-hoc* basis and detailed data needed for planning from below are not available. These improvements have been difficult to achieve in the past owing to inadequate strength of the primary reporting agencies and supervisory staff in comparison to the stupendous increase in their workload as a result of development and welfare activities of the State and democratisation of administration. The most important and urgent task in the field of agricultural statistics is thus to establish fully an efficient reporting system by augmenting it and by setting it up where it does not exist. Ancillary tasks are completion of cadastral surveys in all areas and bringing village maps up-to-date. This is the very foundation of the agricultural statistics system in India and there can be no progress unless this foundation is set firmly.

The next important task is the extension of crop-cutting surveys to the crops and areas not covered so far. Pilot surveys on certain fruits, vegetables and spices crops have to be conducted by the Institute or Agricultural Research Statistics to evolve suitable sampling techniques for adoption as a normal routine by the States. Research investigations for evolving a suitable sampling procedure for estimation of crop production at the block level initiated by the Institute have also made considerable headway so that reliable yield statistics at the block-level become available for planning agricultural production during the Fourth Plan. The gaps in the animal husbandry, forestry and fishery statistics are more pronounced than in crops statistics and special efforts will have to be made to fill them.

Arrangements have also to be made for providing administrators, policy makers, planners and extension workers various operational statistics needed for agricultural development the lack of many of which is a severe handicap in the present planning. These statistics are obtained from surveys, experimentation and adequate analysis of data. Certain pilot surveys and studies need to be taken on a most immediate basis to enable collection of these data on full-scale in the Fourth Plan. Although the principle of planning from below has been accepted, this has not been achieved in practice for want of adequate data needed for the purpose and lack of knowledge of a suitable technique for such planning. It is necessary that a field study by a team of statisticians, economists, agronomists and extension experts should be undertaken in selected areas to study the various problems involved in the preparation of block and village production plans, the data required, and the method of reconciling the targets of production built up from village plans to those obtained by apportioning the national targets to the targets for successive lower levels. Sample surveys for assessment of benefits derived from improved agricultural practices like irrigation, improved seeds, manures and fertilizers, soil conservation and dry farming and land reclamation measures are necessary for proper planning and execution of these measures for increased agricultural production by providing information as to why certain measures do not make

the progress expected for them initially. The other research investigations which need to be carried out immediately relate to assessment of impact of milk supply schemes on rural milk collection centres, cost of production of principal crops, livestock products and poultry and reconciliation of different sets of statistics relating to irrigation, forestry, plantation crops and some commercial crops.

In order to organise collection of various operational statistics needed for agricultural development and to strengthen the technical supervision over collection of administrative statistics, it is an urgent necessity to establish and strengthen statistical units in Agriculture, Animal Husbandry, Dairy, Forests and Fishery Departments in the States and to ensure that these units are manned by well qualified and competent statisticians of ranks comparable to other senior officers in these departments. Similar Statistical Cells also need to be set up under the concerned Advisers in the Ministry of Food & Agriculture; and the Institute of Agricultural Research Statistics needs to be suitably strengthened to guide and coordinate the activities of these Cells in the States and to promote research in the field of agricultural statistics.

Besides organisation of collection of various data, it is also necessary to make arrangements for expeditious analysis of the data collected. A large volume of data has been collected through sample surveys in the past, but they have not been processed and utilised for want of adequate computational facilities. The position with regard to the data to be collected in the future surveys is likely to be worse as more surveys are launched, if adequate computational arrangements are not made. The rapidly enlarging needs for statistics and their analysis to keep pace with planning and agricultural developments requires that we switch over as early as possible and as completely as possible to electro-mechanical methods of computation including use of electronic computers. The extent and depth of the statistical information available for planning and development will only be commensurate with the adoption of these methods in the field of agricultural statistics.

The schemes for improvement of agricultural statistics which are already in operation as well as those for which advance action will be taken during the Third Plan, will have to be continued and expanded in the Fourth Plan. In addition, there will be some schemes which will be initiated in the Fourth Plan. These schemes will broadly include collection of data on operational holdings, improvement in irrigation statistics built up from revenue records and those contained in the Progress Reports on Irrigation Schemes and reconciliation between the two sets of figures, research investigations regarding sample surveys on fertilizers and other manuring practices, estimation of incidence of pests and diseases on crops and losses that can be saved by adopting plant protection measures, statistics of inter-State movement of foodgrains by road, improvements in market intelligence, index numbers relating to agricultural economy, derived statistics in the field of agriculture, etc.

The various schemes for improvement of agricultural statistics discussed in this report are such that their implementation cannot be deferred beyond Fourth Plan. Some of the schemes are, however, time-consuming and involve comparatively heavy expenditure. Considering the limitations in terms of technical and financial resources, a part of some of the schemes could be carried forward to the Fifth Plan. Such schemes are

completion of cadastral survey and institution of reporting system in those tracts where the terrain is difficult and cultivation is spare, organisation of surveys for estimation of production of some minor crops and minor bye-products, collection of a number of derived statistics in the field of agriculture, etc. In the field of animal husbandry, forestry and fishery statistics, much work remains to be done. Even after the various schemes suggested in this report for improvement in these statistics are implemented during the Fourth Plan, much ground will still remain to be covered in the Fifth Plan.

CHAPTER XXIII

RECOMMENDATIONS

GENERAL.

In order that the scheme relating to agricultural statistics do not suffer heavily under the Fourth Plan as they did under the Third Plan as a result of cuts applied to the 'Agricultural Development', and as a result of funds being diverted from statistical schemes to other schemes under this head, this Working Group recommended that 'Agricultural Statistics' should form a separate sub-head in the programme of agricultural developments.

AREA STATISTICS

Strengthening of Primary Reporting and Supervisory Agencies and Extension of Reporting Area

The strengthening of the primary and supervisory land records agencies is the crux of the whole problem of introducing lasting improvement in agricultural statistics, besides implementing effectively the various land reform, development and welfare measures. The system of maintenance of the detailed land records on field-to-field enumeration basis needs to be introduced in Kerala, Orissa and West Bengal also, so as to obtain more reliable and comprehensive statistics which would be useful for planning and administrative purposes at the block level. Steps should, therefore, be taken immediately to strengthen these agencies as per details given in Appendix IV. In the few tracts where complete area enumeration is not feasible, sample survey should be conducted to obtain area statistics.

In view of the importance and urgency for strengthening these agencies, the schemes in this regard should be accorded high priority and action should be initiated immediately in 1964-65 to enable the States to take up these schemes on full scale under the Fourth Plan.

As paucity of funds has been the main difficulty with the States in implementing their proposals in this regard financial assistance from the Centre should be extended on a more liberal basis and assurance should be given immediately to the States that the pattern of assistance adopted in the Third Plan will be extended during the Fourth Plan, so that the States could draw up a phased programme beginning with 1964-65 for the strengthening of the agencies keeping in view their own financial resources, and the capacity of their land records training schools to turn out trained personnel for appointment in the additional posts.

Arrangements necessary to Ensure Regular Flow of Agricultural Statistics after the Establishment of Panchayati Raj

Necessary safeguards should be made to ensure proper and timely maintenance of land records and regular flow of agricultural statistics under the Panchayats.

The development functions and the work relating to land records, etc. should be kept apart and the same agency at the village-level should not be saddled with both the functions.

The desirability of further reducing the jurisdiction of patwaris to enable them to shoulder additional responsibilities under the Panchayats without detriment to land records and agricultural statistics, should be carefully examined.

The existing line of supervision by revenue and land records officers and the district statistical staff should be continued unchanged to ensure quality and timeliness of data.

Adoption of Standardised Classification and Uniform Concepts and Definitions and Other Measures to Improve Area Statistics

The technical staff to finalise and introduce the revised land record forms and to train primary and supervisory agencies to collect and compile the data in these forms should be appointed in each State so as to ensure collection of agricultural statistics according to standardised classification and uniform concepts and definitions and to prepare the necessary background for effecting other improvements in agricultural statistics.

As the revisions in the land record forms and implementation of other recommendations made by the Committee on Improvement of Agricultural Statistics are basic to all improvements in area statistics in the country, immediate action is needed to implement them, and therefore, provision may be made in the Third Plan itself to initiate the necessary measures mentioned above in this regard, and the Ministry of Food & Agriculture should take up with the States the question of expediting the implementation of the various recommendations.

In order to improve the reliability of crop forecasts and the crop statistics used for current planning and administrative purposes, the programme of area enumeration by the primary reporters should be suitably phased over the entire period prescribed for the purpose, and adequate statistical staff should be appointed to guide this work and to analyse expeditiously the data collected.

The scheme of rationalised supervision of the work of area enumeration should be taken on State-wide basis with the twin objective of introducing an element of surprise in the whole supervision programme and to serve as a quality check on area enumeration by the primary reporters. The necessary statistical staff should be appointed at the State headquarters to guide the work of rationalised supervision and to analyse the data collected.

DATA ON CULTIVATOR'S HOLDINGS AND PREPARATION OF FARM AND VILLAGE PRODUCTION PLANS

Need for Data on Cultivators' Holdings for Purposes of Planning and Data for Preparation of Village Production Plans.

The ensuing World Census of Agriculture in 1970 should be conducted in India through a complete enumeration of cultivators' holdings

by making use of the data already available in the village land records and by supplementing it by further enquiries.

The preliminary work relating to the preparation of the schedules and instructions and their printing, training of staff, etc. should start towards the middle of 1968.

The opportunity provided by this Census should further be utilised for placing the agricultural statistics of the country on a firm footing by planning the various enquiries in such a way as to provide all the data required for formulation and execution of agricultural development plans at the block level.

A field study by a team of Statisticians, Economists, Agronomists and Extension Experts should be undertaken in selected areas to study the various problems involved in the preparation of village production plans, the data required and the method of reconciling the targets of production built from village plans to those obtained by apportioning the national targets to the targets for successive lower levels.

The Ministry of Food & Agriculture and of Community Development & Cooperation should arrange such field studies during the Third Plan in order to provide some guidance for this important work during the Fourth Plan and to indicate the type of data that could be collected in the course of the 1970 Agricultural Census.

YIELD STATISTICS

Extension of Crop Estimation Surveys on Important Food & Non-Food Crops

The crop-cutting surveys should be extended to the crops and areas not covered so far, so as to enhance the reliability of the statistics of crop production in the country.

The scheme for the strengthening of the primary and supervisory land records agencies should also take into account the increased work-load on account of the extended crop surveys.

The State Statistical Organisations in charge of the crop-surveys should be suitably and adequately staffed to plan technical improvements in these surveys and to undertake statistical investigations as needed.

The statistical staff both for tabulation and supervision at the district level should be strengthened.

The NSS Directorate should be adequately strengthened to enable it to shoulder the increased work-load and responsibility in planning and guiding the extended surveys, to exercise more adequate and effective supervision on randomised basis both at the harvest and other stages and to tabulate expeditiously the data of randomised supervision.

Extension of Crop Estimation Surveys on Fruits & Vegetables and Condiments & Spices

The surveys on those fruit and vegetable crops for which suitable sampling techniques have already evolved by the Institute of Agricultural Research Statistics, should be extended to all the producing areas.

The pilot surveys either in the selected areas or on State-wide basis should be carried out by the Institute of Agricultural Research Statistics in respect of those fruit, vegetable and spices crops for which suitable

sampling techniques for adoption on State-wide basis as a normal routine have not been evolved.

As soon as the stage of pilot survey is over, the States should be enabled to take-over these surveys as a normal routine under the technical guidance of the Institute of Agricultural Research Statistics.

In order that the various surveys envisaged are undertaken on the desired scale in the Fourth Plan, advance action should be initiated in the Third Plan itself.

Sample Surveys for Estimating Production of Principal Crops at the Block Level

The pilot survey being conducted by the IARS to evolve a suitable sampling technique of crop cutting surveys for obtaining block-level estimates of crop production, should be continued during the remaining years of the Third Five Year Plan.

The pilot surveys being sponsored by the Planning Commission could also be conducted if found feasible under the existing strength of the primary agencies.

Adequate provision should be made under the Fourth Five Year Plan to conduct the surveys for block level estimates of crop production on country-wide basis by adopting the method evolved through the pilot surveys under the Third Plan.

IRRIGATION STATISTICS

Improvement in Irrigation Statistics obtained from Land Records and those, obtained from Progress Reports and Measures to Reconcile them.

The States should be enabled and persuaded to implement the various suggestions made by the Standing Committee on Improvement of Agricultural Statistics to remove the defects in irrigation statistics based on land records, i.e., irrigation statistics contained in Land Utilisation Statistics.

Similarly, efforts should be made both by the Centre and the States to implement the suggestions made by the Minor Irrigation Regional Conferences and the Working Group on Minor Irrigation to ensure the reporting of irrigation statistics in Progress Reports according to uniform concepts and definitions and standard classification, so that their usefulness is increased and the extent of their difference from the irrigation statistics contained in Land Utilisation Statistics is narrowed.

In the sample surveys conducted in Kerala, Orissa and West Bengal for obtaining area statistics, the data on irrigation particulars should also be collected according to the uniform concepts and definitions and standard classification and analysed to obtain estimates of irrigated areas under different crops and by different sources. But as the estimates based on these sample surveys are subject to large standard errors, even at the State level, the system of complete area enumeration should be instituted in these States also as early as possible.

The figures of source-wise irrigated areas compiled at the village level from the basic land records could be recast into (a) areas irrigated from minor irrigation sources and (b) areas irrigated from major-medium

irrigation sources at the Revenue Inspector Circle or Tahsil level on the basis of information available there regarding cost, type and command area of individual irrigation works. The tanks costing less than Rs. 10 lakhs (which is being raised to Rs. 15 lakhs) or irrigating less than 4,000 acres would generally have no canal system originating from them, but would supply water direct to the fields and, therefore, the area irrigated from such tanks and recorded as such in land records, should be treated as irrigated from minor works.

As the accuracy of the figures of benefits reported for the individually owned private irrigation works depends on the correctness of the yardsticks adopted for estimating such benefits, these yardsticks should be evolved on a realistic basis, with due regard to regional variations, and sample surveys should be conducted to verify their accuracy.

The States should initiate studies for making a precise appraisal of the annual loss of irrigation potential owing to silting-up of storage schemes and depreciation or failure of other schemes, in order that the figures of net additional benefits are accurately arrived at.

To reduce the time-lag in publication of irrigation statistics at the national level, States may be requested to consider the feasibility of sending an irrigation return, like crop-forecast returns, on a prescribed date each year.

As irrigation statistics are at present collected by more than one agency at the primary level, it is necessary to exercise proper coordination to obtain uniform set of figures at the State level. For this purpose, a Statistical Cell in appropriate department in each State should be set up. This Cell will give exclusive attention to the problems of improvement of irrigation statistics including those of reconciliation between the different sets of figures.

Assessment of Additional Area and Production from Irrigation Works

Sample surveys should be conducted on a continuous basis in the different parts of the country to assess both old and new areas brought under irrigation, increase in yield rates of crops due to irrigation, and changes in the cropping pattern. The sample surveys undertaken for assessment of irrigation benefits may also take into account the study of cropping pattern under different types of irrigation projects and provide necessary data for fixation of yardsticks of benefits accruing from different types of irrigation works with due regard to regional variations.

The scope of the sample survey may be confined to those items on which information was not already available from revenue and irrigation records. An appropriate system for culling out and coordinating the information already available in official records and for effecting necessary improvements in them should be established. This system could be worked through the Statistical Cell which is recommended to be established in appropriate department in each State. This Cell will also be responsible for organising the sample surveys for assessment of irrigation benefits in conjunction with NSS.

The work of coordination of irrigation statistics at the district level could be entrusted to District Administration which should maintain a

close liaison with all the executive agencies incharge of irrigation programme in the district and develop an appropriate reporting system to secure the necessary data.

A Central Committee of the concerned Advisers should be set up to effect necessary coordination and to look into the various problems of improvement in irrigation statistics including conducting of sample surveys for assessment of irrigation benefits.

Problem-oriented evaluation studies on irrigation benefits should continue to be conducted as they provide a fair assessment of the problems faced in the execution of the projects and the impact of the projects on the economy.

ASSESSMENT OF BENEFITS OF IMPROVED AGRICULTURAL PRACTICES

The sample survey being conducted under the auspices of the Directorate of National Sample Survey for estimation of area under improved agricultural practices, should be extended to the entire area in each State and to more improved practices, *viz.*, improved seeds, manures and fertilisers (including rural compost and green manuring), dry farming and plant protection measures.

As the staff of the State Agriculture Departments would be the ideal agency for the conduct of the survey on improved agricultural practices, the field work could be entrusted to the Progress Assistants and VLWs, only when the field staff of the Agriculture Department are not available for the purpose. In any case, the Agriculture Department should make necessary arrangements for effective supervision over the field work.

As regards the main concepts and definitions and the terms arising in the collection of statistics of improved varieties of crops, the recommendations made by the Technical Working Party set up in the Ministry of Food & Agriculture in 1957, should be implemented. In the sample survey, improved seeds distributed through registered or authorised dealers and institutions and Government agencies should be treated as 'improved' and in the case of 'natural spread' data should be classified separately under 'in use up to 3/5 years' and 'in use for more than 3/5 years'.

As the estimates regarding coverage of improved practices at periodical intervals suffice, the NSS survey might be conducted once in 5 years.

Supplemented by the data collected in the course of normal crop-cutting surveys and simple fertilizers' trials in cultivators' fields, the NSS survey should be able to provide the estimates of areas of principal crops under improved seeds.

So far as the estimates of yardsticks for additional yield due to improved seeds are concerned, they could be obtained from the data collected through trials of improved seed and local seed in cultivators' fields.

The staff doing the crop-cutting surveys and the experimental Assistants conducting fertilizers' trials in cultivators' fields should be given adequate training so as to enable them to identify improved varieties and to analyse properly the data collected on them in the various surveys.

In order to ensure proper coordination of the results obtained from the NSS surveys on the extent of improved agricultural practices and normal crop-cutting surveys, it would be desirable that the organisations in the States responsible for the latter should also be responsible for the former.

In order to enable the Fertiliser Division of the Ministry of Food & Agriculture to collect, compile and analyse the requisite data on fertilizers and manures for purposes of proper planning of fertilizer production and consumption and also for assessing periodically the extent of realisation of the set targets of additional production due to fertilizers, the Statistical Unit of this Division should be suitably strengthened.

The model scheme prepared by the IARS for estimation of production of compost and manures should be passed on to the States and they should be enabled to take it up.

In order to obtain reliable estimates of area under soil conservation, dry farming and land reclamation measures and increase in yield-rates of principal crops due to these measures in different agro-climatic regions and for time-spread from 1–5 years after adoption of the measures, the Institute of Agricultural Research Statistics should conduct pilot studies during the Third Plan itself for gathering the necessary technical material for designing such surveys in the Fourth Plan.

The data collected on different improved agricultural practices and various items of farm economics under the IADP surveys and the normal crop cutting surveys should be analysed regularly to provide some estimates of benefits from improved agricultural practices. To enable the Statistical Organisations in the States to complete this analysis expeditiously, they should be suitably strengthened as recommended earlier.

Problem-oriented diagnostic studies on improved agricultural practices and land improvement measures should be conducted, as they had their focus on certain problems and issues arising in the course of implementation of programmes which require detailed observation and analysis.

DIAGNOSTIC STUDIES TO RECONCILE THE DIFFERENCES BETWEEN THE STATISTICS COLLECTED BY MORE THAN ONE AGENCY

The Standing Committee on Improvement of Agricultural Statistics set up under the Ministry of Food & Agriculture should examine the various problems involved item by item and the Directorate of Economics & Statistics in that Ministry should formulate schemes for type studies in one or two selected areas to diagnose the causes for differences and suggest measures for reconciliation. The type studies might first be started with regard to forests and tea statistics.

The type studies should be given high priority and advance action should be taken during the Third Plan itself, in order that detailed studies could be planned on proper lines during the Fourth Plan.

The Scheme of the Indian Central Tobacco Committee for reconciling discrepancy in tobacco statistics should be implemented.

STATISTICS OF INTER-STATE MOVEMENT OF FOODGRAINS BY MOTOR VEHICLES

The Directorate of Economics & Statistics in the Ministry of Food & Agriculture may continue their efforts to obtain from the States the statistics of inter-State movement of food-grains by motor vehicles under the existing legal provisions.

The Directorate of Economics & Statistics might also look into the details of the ISI-N.S.S. Goods Traffic Survey and the Survey of the Transport Ministry and examine how far the data envisaged under their scheme could be obtained from these surveys. Should it be even necessary to launch a separate survey for collecting data on inter-State movement of foodgrains by motor vehicles, the details thereof should be settled in consultation with the Department of Statistics and the Transport Ministry.

IMPROVEMENT OF PRICE INTELLIGENCE

Considering the importance of comprehensive market intelligence in formulating and executing the agricultural production and price policies, the Group recommended the strengthening of the Price Intelligence Division of the Directorate of Economics & Statistics in the Ministry of Food & Agriculture and counterpart organisations in the States, appointment of whole-time reporters in selected markets and supervisory officers in different zones in each State, improvement of the reporting system in other markets, organisation of suitable programmes for the training of the supervisory and reporting agencies in the States, wider dissemination of market news through the All-India Radio and quick mechanical tabulation and display of the market information collected.

Advance action with regard to the training of the reporting and supervisory staff of the States was considered necessary to lay the foundation for taking up the scheme under the Fourth Plan.

INDEX NUMBERS RELATING TO AGRICULTURAL ECONOMY

Attempts should be made to construct the various index numbers relating to agricultural economy with a view to preparing National Agricultural Sector Accounts and the Directorate of Economics & Statistics, Ministry of Food & Agriculture should be associated with the work to be undertaken in this regard.

A list of key indices relating to agricultural economy should be prepared and recommended to the States, and the States should be given necessary technical and financial assistance to enable them to compile these indices.

A blue-book giving uniform concepts and definitions, standardised procedure and the detailed instructions for the construction of these indices should be prepared for the guidance of the concerned staff in the States.

Training in the theory and methodology of construction of index numbers should be imparted to the staff associated with them in the States at periodic intervals.

Ways and means should be explored to build up the all-India index numbers of agricultural production, area under crops and agricultural productivity directly from the similar State indices.

In view of the urgent need and large scope for introducing further improvements particularly in regard to the index numbers which are not published at present, a Technical Committee should be set up to go into these improvements and suggest ways and means to effect them.

DERIVED STATISTICS IN THE FIELD OF AGRICULTURE

Necessary surveys should be conducted once in five years, if not every year, to collect data on inputs and other costs in agriculture, production of bye-products and minor crops, etc. required for purposes of national income estimation.

Data thrown up by the National Sample Survey, Agro-Economic Research Centres, Farm Management Studies, Cost of Production Surveys etc., should be made use of for filling the gaps in availability of information relating to population-growth, savings, national income, household income, State income and consumption separately for rural and urban sectors, income or expenditure, quantity and price elasticities, private stocks, income-State movement of commodities, etc., which are required for working out demand projections of various agricultural commodities. Further efforts should also be made to collect additional information to fill the gaps that still remained.

Necessary surveys should be conducted for working out capital-output and cost benefits ratios for different sectors and sub-sectors of the agricultural economy as well as for different types of schemes and areas and for collecting data on direct and indirect employment potential created by agricultural schemes.

While data on seeds could be collected in the course of crop-cutting surveys and farm management studies and those on feed in the course of surveys on animal husbandry practices, a special enquiry should be organised to collect data on wastage at the various stages.

The measures necessary to fill the gaps in the derived statistics should be examined in detail, by the Technical Committee to be set up for the Index Numbers relating to Agricultural Economy.

AGRICULTURAL RESEARCH STATISTICS

Full-fledged Statistical Units under competent qualified statisticians should be set up in the State Agricultural Departments and Agricultural Institutes to enable undertaking of research work.

ANIMAL HUSBANDRY STATISTICS

In order to fill the serious gaps in the statistics relating to animal husbandry and dairying and to improve the quality and range of the existing statistics, full-fledged Statistical units under competent, qualified statisticians should be set up in the State Departments of Animal Husbandry and Dairying.

Similar Statistical Cells should be set up under the Animal Husbandry Adviser and Dairy Development Adviser in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.

Till the State-wise surveys are undertaken by the respective States the Institute of Agricultural Research Statistics should extend its surveys for estimation of production of milk, meat, egg and poultry and collection of data on animal husbandry, sheep-rearing and poultry practices to the areas not covered so far, so as to provide estimates atleast at the All-India level. The IARS should also repeat these surveys at suitable interval in order to study changes taking place.

The Statistical Organisations at the Centre should conduct pilot surveys to develop suitable sampling techniques and once that was done the State should be encouraged to take over the statistical surveys and their work should be coordinated by the Statistical Cells at the Centre.

FORESTRY STATISTICS

In order to fill the serious gaps in the forestry statistics and to improve the quality and range of the existing forestry statistics, full-fledged Statistical Units under competent, qualified statisticians should be set up in the State Forests Departments.

A similar Statistical Cell should be set up under the Inspector General of Forests in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.

The Statistical Organisations at the Centre should conduct pilot surveys to develop suitable sampling techniques and once that was done the States should be encouraged to take over the statistical surveys and their work should be coordinated by the Statistical Cells at the Centre.

The Standing Committee on Improvement of Agricultural Statistics set up in the Ministry of Food & Agriculture should look into the various problems connected with reconciliation of discrepancies between the two sets of figures of area under forests, and the Directorate of Economics & Statistics in the Ministry should take up pilot studies in one or two selected areas to diagnose the causes thereof and to suggest measures for reconciliation.

FISHERY STATISTICS

In order to fill the serious gaps in the fishery statistics and to improve the quality and range of the existing statistics, full-fledged Statistical Units under competent, qualified statisticians should be set up in the State Fishery Departments.

A similar Cell should be set up under the Fisheries Development Adviser in the Ministry of Food & Agriculture to guide and coordinate the activities of the Statistical Cells in the States.

The surveys conducted by the Central Marine Fisheries Research Institute, Mandapam, and the Central Inland Fisheries Research Institute, Barrackpore, for estimation of marine and inland fisheries production, should be suitably guided and coordinated by the Statistical Cell to be

set up under the Fisheries Development Adviser in the Ministry of Food & Agriculture.

As regards fresh water fishery, the NSS should extend the pilot surveys already being conducted in Orissa to other areas to evolve suitable sampling techniques for estimation of fresh water fish production.

The Statistical Organisation at the Centre should conduct pilot surveys to develop suitable sampling techniques and once that was done the States should be encouraged to take over the statistical surveys and their work should be coordinated by the Statistical Cells at the Centre.

RESEARCH INVESTIGATION

Research investigations relating to (a) sample surveys on fertilizer and other manuring practices, (b) estimation of incidence of pests and diseases, (c) estimation of cost of cultivation of crops and (d) estimation of cost of production of milk, should be continued during the Fourth Five Year Plan according to the programme suggested by the Institute of Agricultural Research Statistics.

Research investigations relating to the study of the impact of milk supply schemes on rural milk collection centres, and pilot surveys on cost of production of poultry, in one or two areas like Gurdaspur where poultry development has made some headway on organised lines, should be taken up in the Fourth Five Year Plan in accordance with the IARS proposals.

Advance action should be taken in the Third Plan itself so as to evolve the suitable sampling techniques for taking up of the surveys for the study of the impact of milk supply schemes on rural milk collection centres and the cost of production of poultry on an appropriate scale during the Fourth Plan.

The scope and desirability of extending the research investigations to other items like economics of mechanised fishing, studies of factors responsible for changes in cropping pattern, etc. should be examined.

The cost of cultivation surveys should cover rice, wheat, jowar, cotton, jute, sugarcane, tobacco and groundnut in the different regions of the country.

The family budget surveys of the farmers and the cost of marketing surveys could be conducted on the sample of household selected for the cost of production surveys.

The extension of cost of production studies and farm management studies during the Fourth Plan should be planned in such a way that the districts to be covered in the farm management studies are not covered by the cost of production studies and *vice versa*.

The data on cost of cultivation of crops available from the farm management studies should be tabulated according to scale of operation, *i.e.*, holding-sizes so as to analyse the economics of scale.

The data provided by the farm management studies should also be analysed with a view to locating the peak period of demand for labour so as to indicate the possibility of adopting selective mechanisation at such peaks for reducing costs.

While the scheme prepared by the Plant Production Adviser for collecting necessary data for forecasting out-break of crop pests and diseases and issuing warning to the farmers should be implemented, the incidence of crop pests and diseases will have to be assessed objectively through the type of surveys carried out by the Institute of Agricultural Research Statistics. The IARS surveys would further provide a scientific basis for developing the forecasting and warning services proposed to be initiated by the Plant protection Adviser.

CROP AND CATTLE INSURANCE

The scheme for crop insurance should be taken up in more States during the Fourth Five Year Plan.

The scheme for cattle insurance should be initiated in those areas which have been selected by the State Animal Husbandry Departments for Intensive Cattle Development during the Third Plan itself and should be further extended during the Fourth Plan.

STRENGTHENING OF THE INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS

In view of the importance of research work done at the Institute of Agricultural Research Statistics in developing appropriate methodology and system for improving the range and quality of existing statistics and for obtaining new types of data needed for formulation, execution and assessment of development projects, the Working Group recommended expansion of the research activities of the Institute as laid down in its note.

ESTABLISHMENT OF A PLANNING CELL FOR AGRICULTURE

Appreciating the need for the various studies in connection with the formulation and execution of projects for agricultural development, the Group recommended the setting-up of a Planning Cell in the Ministry of Food & Agriculture.

Estimates of Expenditure on Schemes for Improvement of Agricultural Statistics during the Fourth Five Year Plan Period and Provision for Advance Action during Third Five Year Plan Period

(Lakh rupees)

Scheme	Estimated expenditure during the Fourth Plan	Proposed provision for Advance Action, during Third Plan
1	2	3
I. Strengthening of Primary Reporting and Supervisory Agencies and Extension of Reporting Area	2,166.00	120.00
II. Adoption of Standardised classification and uniform concepts and Definitions and other schemes for Improvement of Area Statistics	21.00	8.00
Extension of Crop Estimation Surveys on Important Food and Non-food Crops	128.40	—
Crop Estimation Surveys on—		
Fruits	27.00	2.88
Vegetables	9.00	2.88
Cashewnut and Spices Crops	14.00	—
Sample Surveys for Estimation of Production of Principal Crops at the Block Level	300.00	—
Creation of Strengthening of Statistical Cell in Appropriate Departments in States for Improvement of Irrigation Statistics and Sample Survey to verify the Yardsticks of Irrigation Benefits	15.00	2.00
Surveys for Assessment of Additional Area of and Production from Irrigation Works	56.00	—
Surveys for Assessment of Areas under Improved Agricultural Practices	25.00	1.00
Sample Survey for Estimation of Area under and Increase in Crop Yields from Soil Conservation and Land Reclamation Measures	25.00	—
Sample Survey for Estimation of Production of Compost and Manure in Rural Areas	20.00	—
Research Investigations Regarding—		
Impact of Milk Supply Schemes on Rural Milk Collection centres	8.00	2.88
Sample Survey on Fertilizer and other Milk Manuring	5.30	—
Estimation of Incidence of Pests and Diseases	60.00	—
Estimation of Cost of Cultivation of Crops	20.00	—
Estimation of Cost of Production of Milk	30.00	—
Cost of Production of Poultry	4.00	1.44

Estimates of Expenditure Schemes for Improvement of Agricultural Statistics during the Fourth Five Year Plan Period and Provisions for Advance Action during the Third Five Year Plan Period—contd.

	1	2	3
Creation of Statistical Cells in—			
State Departments of Agriculture	30.00	4.00	
State Departments of Animal Husbandry and Dairy ..	30.00	8.00	
State Departments of Forestry	20.00	4.00	
State Departments of Fisheries	20.00	4.00	
Creation of Statistical Cells at the Centre for—			
Animal Husbandry & Dairying Statistics	4.00	0.80	
Forestry Statistics	4.00	0.80	
Fisheries Statistics	3.00	0.60	
Strengthening of Fertilizer Division of the Department of Agriculture in the Ministry of Food & Agriculture ..	1.50	—	
Estimation of Livestock Products	40.00	—	
Pilot Surveys for Fresh Water Fisheries	8.00	—	
Improvement of Price Intelligence	197.00	1.00	
Strengthening of Institute of Agricultural Research Statistics (I.C.A.R.)	20.00	2.00	
Data on Cultivators' Holdings for Purposes of Planning ..	100.00	0.20	
Index Numbers Relating to Agricultural Economy ..	7.00	—	
Diagnostic Studies to Reconcile the Differences between the Statistics Collected by more than one Agency	5.00	0.60	
Statistics of Inter-State Movement of Foodgrains by Motor Vehicles	8.00	—	
Derived Statistics in the Field of Agriculture	12.00	—	
Setting up of a Planning Cell	4.00	0.40	
Crop and Cattle Insurance	50.00	1.00	
TOTAL II	1,341.20	48.08	
TOTAL (I) + (II)	3,497.20	168.08	

Membership of the Working Group on Agricultural Statistics

1. Dr. V. G. Panse, Chairman
Statistical Adviser,
Indian Council of Agricultural Research.
2. Shri R. Giri, Convenor
Assistant Economic & Statistical Adviser,
Ministry of Food & Agriculture.
3. Shri S. C. Chaudhri,
Economic & Statistical Adviser,
Ministry of Food & Agriculture.
4. Shri D. P. Singh,
Joint Secretary (Agriculture),
Planning Commission.
5. Dr. J. P. Bhattacharjee,
Director,
Programme Evaluation Organisation,
Planning Commission.
6. Dr. Uttam Chand,
Joint Director,
Central Statistical Organisation.
7. Shri C. R. Seshadri,
Director (Agri.),
Planning Commission.
8. Shri J. S. Sarma,
Additional Economic & Statistical Adviser,
Ministry of Food & Agriculture.
9. Shri V. R. Rao,
Director (Admn. Intelligence),
Ministry of Community Development & Cooperation.
10. Dr. A. Vaidyanathan,
Assistant Chief (P.P.),
Planning Commission.
11. Shri G. R. Ayachit,
Deputy Director (Agri.),
Directorate of National Sample Survey.
12. Shri D. D. Singh,
Research Officer,
Agriculture Division,
Planning Commission.

APPENDIX II

Exports other than Members, Invited to Attend the Meetings of the Working Group on Agricultural Statistics

Ministry of Food & Agriculture

<i>I.A.R.S.</i>	1. Dr. G. R. Seth, Dy. Statistical Adviser.	
	2. Shri D. Singh, Dy. Statistical Adviser.	
	3. Dr. B. V. Sukhatme, Prof. of Statistics.	
	4. Shri T. P. Abraham, Asstt. Statistical Adviser.	
	5. Shri V. N. Amble, Asstt. Statistical Adviser.	
	6. Shri K. S. Krishnan	} Statisticians
	7. Shri S. D. Bokil	
	8. Shri M. Rajagopalan	
	9. Shri V. V. R. Murti	

<i>Dte. of E & S.</i>	1. Shri Ram Saran, Production Economist.	
	2. Dr. B. P. Dutia, Dy. Economic & Statistical Adviser.	
	3. Shri R. S. Chadha, Asstt. Economic & Statistical Adviser.	
	4. Shri B. C. Saxena, Insp. Officer	
	5. Shri C. Ramalingam	} Research Officers
	6. Shri N. Ramamurthy	
	7. Shri S. L. Sharma	
	8. Shri Lal Singh	
	9. Shri Krishan Chander	

<i>Department of Agriculture</i>	1. Shri Mahavir Prasad, Irrigation Adviser.	
	2. Shri J. K. Jain, Dy. Irrigation Adviser.	

Planning Commission	1. Shri J. N. Tiwari, Jt. Director, Programme Evaluation Organisation.	
	2. Shri N. K. Dikshit, Senior Research Officer.	

Ministry of C. D. & C.	1. Dr. N. V. A. Narsimhan, Director (Administrative Intelligence).	
	2. Shri Y. P. Rajput, Dy. Director (Administrative Intelligence).	

APPENDIX II—*contd.***Department of Statistics***Central Statistical Organisation*

1. Dr. K. S. Rao,
Joint Director.
2. Shri N. S. Choudhry,
Assistant Director.
3. Shri K. S. Awadhany,
Assistant Director.
4. Shri V. N. Muthy,
Assistant Director.
5. Shri R. Galla,
Research Officer.

Directorate of National Sample Survey

1. Shri K. S. Krishnaswami,
statistician.

Central Water & Power Commission ..

1. Shri D. B. Anand,
Member (WR).
 2. Shri S. S. Lamba,
Director (WIN).
 3. Shri B. C. Patchigar,
Deputy Director.
-

APPENDIX III

List of Items on which Member Organisations and other Working Group were requested to prepare Papers

Member Organisation/ Working Group	Description of the Papers alongwith its Code Number	Chapter in which the Paper is discussed
(1)	(2)	(3)
<i>Directorate of Economics and Statistics.</i>	DES-1 : Strengthening of Primary Reporting and Supervisory Agencies and Extension of Reporting Area.	III
	DES-2 : Adoption of Standardised Classification and Uniform Concepts and Definitions and other Measures to Improve Area Statistics.	III
	DES-3 : Need for Data on Cultivators' Holdings for Purposes of Planning.	IV
	DES-4 : Improvement in Irrigation Statistics obtained from Land Records.	VI
	DES-5 : Diagnostic Studies to Reconcile the Differences Between the Statistics Collected by More than One Agency.	VIII
	DES-6 : Statistics of Inter-State Movement of Foodgrains by Motor Vehicles.	IX
	DES-7 : Improvement of Price Intelligence.	X
	DES-8 : Index Numbers Relating to Agricultural Economy.	XI
	DES-9 : Derived Statistics in the Field of Agriculture.	XII
	DES-10 : Animal Husbandry & Dairying Statistics.	XIV&XVII
	DES-11 : Improvement of Forestry Statistics	XVI
	DES-12 : Improvement in Fisheries Statistics	XVI
	DES-13 : Co-ordination of Cost of Production Studies.	XIV
	DES-14 : Establishment of Planning Cell for Agriculture.	XX
	DES-15 : Agricultural Statistics in the Long Range Perspective	XXII
<i>Directorate of National Sample Survey.</i>	NSS-1 : Extension of Crop Estimation Surveys on Important Food and Non-food Crops.	V
	NSS-2 : Assessment of Additional Area and Production from Irrigation Works.	VI
	NSS-3 : Sample Survey for the Estimation of Area Brought under Improved Agricultural Practices.	VII

APPENDIX III—contd.

(1)	(2)	(3)
<i>Institute of Agricultural Research Statistics.</i>	IARS-1 : Crop Estimation Surveys on Fruits, Vegetables, Condiments and Spices.	V
	IARS-2 : Sample Surveys for Estimating Production of Principal Crops at the Block-level.	V
	IARS-3 : Use of Data collected from Normal Crop Cutting Surveys for Assessment of Area and Production of Improved Practices.	VII
	IARS-4 : Agricultural Research Statistics in the States.	XIII
	IARS-5 : Surveys for Estimation of Annual Production of Important Live-stock Products and for Collection of Data on Animal Husbandry Practices.	XIV
	IARS-6 : Research Investigations relating to (1) Study of the Impact of Milk Supply Schemes on Rural Milk Collection Centres, (2) Sample Surveys on Fertilizer & other manuring Practices, (3) Estimation of Incidence of Pests & Diseases, (4) Estimation of Cost of Cultivation of Rice, Wheat, etc., (5) Estimation of Cost of Production of Milk, (6) National Index of Field Experiment.	XVII
	IARS-7 : Crop & Cattle Insurance.	XVIII
	IARS-8 : Strengthening of the Institute of Agricultural Research Statistics (I.C.A.R.)	XIX
	IARS-DES-I Requirements of Trained Personnel, Training & Equipment.	XXI
<i>Ministry of Community Development & Cooperation.</i>	CD&C-1 : Arrangements Necessary to Ensure Regular Flow of Agricultural Statistics after the Establishment of Panchayati Raj.	III
	CD&C-2 : Requirements of Data for Preparation of Village Production Plans.	IV
<i>Planning Commission</i>	(i) <i>Perspective Plan Division.</i>	
	PC-1 : Crop-Pattern on Areas Irrigated by Individual Projects.	VI
	(ii) <i>Programme Evaluation Organisation.</i>	
	PEO-I : Studies on Evaluation of Irrigation Benefits.	VI
	PEO-2 : Problem-oriented Diagnostic Studies relating to Improved Agricultural Practices and Land Improvement Measures.	VII
<i>Working Group on Minor Irrigation.</i>	WGMI-1 : Improvement in Irrigation Statistics obtained from Progress Reports and Measures to Reconcile them with those obtained from Land Record.	VI

APPENDIX III—contd.

(1)	(2)	(3)
<i>Working Group on Improved Seed.</i>	WGIS-1 : Estimation of Coverage of Improved Seeds and Additional Production therefrom.	VII
<i>Working Group on Manures & Fertilizers.</i>	WGMF-1 : Statistics of Fertilizers and other Manuring Practices.	VII
<i>Working Group on Soil Conservation & Land Reclamation.</i>	WGSLR-1 : Assessment of the Benefits of Soil Conservation, Dry Farming and Land Reclamation Measures.	VII

APPENDIX IV
(a) Extent of Increase Proposed in the Strengthening of Primary and Supervisory Land Records Agencies

State	Present strength		Average No. of villages per patwari	Percentage increase proposed in the present strength	Total annual cost for the additional staff (Rs. in lakhs)	Year-wise break-up (Rs. in lakhs)				Total
	Numbers of primary reporters	No. of super- visory officers at various levels				1966-67	1967-68	1968-69	1969-70	
Andhra Pradesh...	10,290	N. A.	3	N. A.	†	0.46	0.92	1.38	1.85	2.31
Assam (Plains districts)...	1,192	222	15	100	125	3.00	6.00	9.00	12.00	15.00
Bihar ..	6,314	1,841	13	100	3	11.90	23.80	35.69	47.58	59.48
Gujarat ..	4,086	1,151	5	50	33	9.80	19.60	29.40	39.20	49.00
Madhya Pradesh ..	14,601	943	5	50	55	16.74	33.48	50.22	66.96	83.70
Maharashtra ..	9,370	1,102	4	33	26	8.20	16.58	24.87	33.16	41.45
Mysore ..	7,444	933	4	50	20	8.00	16.00	24.00	32.00	40.00
Punjab ..	6,042	592	4	16.5	140	7.75	15.51	23.26	31.02	38.77
Rajasthan ..	7,924	662	4	62	66	14.33	28.66	42.98	57.31	71.64
U. P. (Plain area, (Hilly area) ..	18,206	1,599	6	50	27	20.60	41.21	61.81	82.42	103.02
Delhi ..	273	96	54	200	100					
Himachal Pradesh ..	87	12	4	100	100	0.32	0.65	0.97	1.30	1.62
Total 14 States ..	545	134	20	100	60	1.55	3.10	4.64	6.19	7.74
Other States excluding Kerala, Orissa, West Bengal ..						513.73	102.74	308.22	410.99	513.73
Total all States excluding Kerala, Orissa and West Bengal ..						55.00	22.00	33.00	44.00	55.00
						568.73	113.74	341.22	454.99	568.74
							227.51			1,706.19

† One Statistical Assistant is being appointed in each taluk for supervisory work.

APPENDIX IV—contd.

(b) *Institution of Suitable Agency for Maintenance of Land Records and Collection of Agricultural Statistics on a Regular Basis in Kerala, Orissa, West Bengal*

State	Estimated Cost during the Fourth Plan (Rs. in lakhs)					
	1966-67	1967-68	1968-69	1969-70	1970-71	Total
Kerala	5.00	10.00	15.00	20.00	25.00	75.00
Orissa	12.00	24.00	36.00	48.00	60.00	180.00
West Bengal	11.00	22.00	33.00	44.00	55.00	165.00
TOTAL	28.00	56.00	84.00	112.00	140.00	420.00

(c) *Sample Survey for Building up Area Statistics of Non-reporting Area and Area for which Only ad hoc Conventional Estimates are at Present available*

State	Estimated Cost during the Fourth Plan (Rs. in lakhs)					
	1966-67	1967-68	1968-69	1969-70	1970-71	Total
Andhra Pradesh	0.29	0.29	0.30	0.31	0.31	1.50
Assam	1.45	1.47	1.50	1.53	1.54	7.49
Gujarat	0.50	0.51	0.52	0.53	0.53	2.59
Jammu & Kashmir	2.13	2.16	2.21	2.23	2.24	10.97
Madras	0.34	0.35	0.35	0.36	0.36	1.76
Maharashtra	0.36	0.37	0.37	0.38	0.38	1.86
Rajasthan	0.85	0.86	0.88	0.89	0.90	4.38
Uttar Pradesh	0.69	0.71	0.72	0.73	0.74	3.59
Himachal Pradesh	0.28	0.29	0.29	0.30	0.30	1.46
Manipur	0.39	0.40	0.41	0.42	0.42	2.04
Tripura	0.18	0.19	0.19	0.20	0.20	0.96
TOTAL	7.46	7.60	7.74	7.88	7.92	38.60

1	2	3	4	5	6	7	8
Gujarat	Tur	—	—	210	200	100	1 Statistical Assistant.
	Small millets ..	231	282	169	350		1 Computer
	Other pulses (K) ..	—	—	672	350		
	Other pulses (R) ..	—	—	126	200		
	Sesamum ..	73	170	208	200		
	Castor	119	210	61	200		
					1,500		
Jammu & Kashmir	—	—	—	—	—	—	—
Kerala	—	—	—	—	—	—	—
Madhya Pradesh	Maize	947	492	209	100	100	1 Statistical Assistant.
	Small millets ..	2,874	650	448	350		
	Other pulses (K) ..	—	—	1,504	400		
	Other pulses (R) ..	1,493	452	1,531	400		
	Sugarcane ..	—	—	115	150		
					1,400		
Madras	Tur	—	—	148	200	100	1 Statistical Assistant.
	Small millets ..	—	—	1,249	400		1 Computer
	Other pulses (K) ..	—	—	886	350		
	Sesamum ..	—	—	313	200		
	Castor ..	—	—	30	200		
	Tobacco ..	—	—	49	200		
	Potato ..	—	—	26	200		
					1,750		

Maharashtra	139	120	395	200	180 1 Statistical Assistant 2 Computers
	..	..	..	..	541	506	779	300
	..	..	..	..	—	—	455	350
	..	Small millets (K)	..	..	—	—	2,738	700
	..	Other pulses (K)	..	..	—	—	612	350
	..	Other pulses (R)	..	..	—	—	178	200
	..	Seamum	..	..	109	98	320	200
	..	Linseed	..	..	242	246	180	200
	..	Sugarcane	..	..	141	232	54	200
	..	Potato	..	..	—	—	<hr/>
	..	..	..	..	—	—	2,700	

Mysore	2,065	400	109	100	120 1 Statistical Assistant 1 Computer
	..	..	..	..	535	200	60	100
	..	..	..	..	—	—	1,010	400
	..	..	..	..	—	—	1,594	500
	..	..	..	..	—	—	338	350
	..	..	..	..	63	150	33	100
	..	..	..	..	124	182	40	100
	..	..	..	..	—	—	94	200
	—	—	—	—	
	—	—	—	—	
	—	—	—	—	

Orissa	165	200	35 1 Statistical Assistant.
	..	..	..	..	..	..	..	..	..	115	200
	..	..	..	..	..	..	..	..	..	302	200
	..	..	..	..	..	..	..	..	..	833	200
	..	..	..	..	..	..	..	..	..	60	200
	..	..	..	..	..	..	..	..	..	228	200
	..	..	..	..	..	..	..	..	..	118	200
	..	..	..	..	..	..	..	..	..	52	200
	..	..	..	..	..	..	..	..	..	59	150
	—	—	
	—	—	

APPENDIX V—*contd.*

1	2	3	4	5	6	7	8
Punjab	Other pulses (K) Other pulses (R) Groundnut ..	— — —	— — —	317 179 180	350 350 200	60	1 Computer
					900		
Rajasthan	Rice Small millets (K) Other pulses (K) Sugarcane ..	— — — —	— — — —	243 207 4,186 31	200 200 1,000 150	150	1 Statistical Assistant
					1,550		
Uttar Pradesh	Rice Wheat .. Barley .. Wheat+Barley Small millets (K) Other pulses (K) Other pulses (R) Sesamum .. Linseed .. Rape & Mustard Sugarcane .. Tobacco .. Potato ..	9,820 9,548 4,382 — — — 2,660 152 200 381 2,706 — —	3,400 3,850 3,250 — — — 2,250 300 300 500 5,572 — —	406 466 221 1,079 1,499 433 465 1,407 1,043 4,392 677 41 280	200 200 200 500 500 350 350 500 500 1,000 400 200 200	375	2 Statistical Assistants 2 Computers
					5,100		
West Bengal	—	—	—	—	—		
Delhi	—	—	—	—	—		
Himachal Pradesh	—	—	—	—	—		
	TOTAL ..	..	..	..	23,450	1,368	11 Statistical Assistants 12 Computers

APPENDIX VI

Scale of Inspection proposed for the State Departmental Statistical Staff in respect of the Additional Experiments and Additional Supervisory Staff required

State	No. of addl. expts. proposed			Addl. supervisory staff required	
	for survey	for inspection by		Departmental	Statistical
		Departmental staff	Statistical staff		
1	2	3	4	5	6
Andhra Pradesh ..	1,800	270	140	30	3
Assam	750	*	110	*	4
Bihar	2,400	360	180	40	5
Gujarat	1,500	230	110	25	6
Jammu & Kashmir ..	—	—	—	—	—
Kerala	—	—	—	—	—
Madhya Pradesh ..	1,400	210	110	23	2
Madras	1,750	260	130	29	3
Maharashtra ..	2,700	400	200	45	6
Mysore	1,850	280	140	31	4
Orissa	1,750	*	260	*	3
Punjab	900	140	70	15	2
Rajasthan	1,550	230	120	26	3
Uttar Pradesh ..	5,100	770	380	85	11
West Bengal ..	—	—	—	—	—
Himachal Pradesh ..	—	—	—	—	—
Delhi	—	—	—	—	—
TOTAL ..	23,450	3,150	1,950	349	57

*Statistical staff are synonymous with departmental staff.

(b) Number of experiments proposed for Harvest Stage randomised inspection (by rotation)

State	No. of experiments proposed for									
	I Year			II Year			III Year			Total
	Other Kharif pulses	Tobacco and other Rabi pulses	Total	Ground-nut	Sugarcane and castor	Total	Sesamum	Linseed, and Rape & Mustard		
I	2	3	4	5	6	7	8	9	10	
Andhra Pradesh	30	60	90	40	100	140	30	—	30	
Assam ..	—	20	20	—	20	20	—	20	20	
Bihar ..	20	80	100	—	40	40	—	40	40	
Gujarat ..	20	40	60	90	40	130	20	—	20	
Jammu & Kashmir	—	—	—	—	—	—	—	—	—	
Kerala ..	—	—	—	—	—	—	—	—	—	
Madhya Pradesh	30	30	60	20	—	20	40	100	140	
Madras ..	20	20	40	40	40	80	20	—	20	
Maharashtra ..	50	40	90	50	20	70	20	40	60	
Mysore ..	30	50	80	40	40	80	20	20	40	
Orissa ..	20	20	40	—	40	40	20	—	20	
Punjab ..	20	20	60	10	30	40	—	40	140	
Rajasthan ..	60	—	60	—	—	—	60	60	120	
Uttar Pradesh	20	80	100	20	100	120	60	170	230	
West Bengal ..	—	20	20	—	20	20	—	40	40	
Himachal Pradesh	—	—	—	—	—	—	—	—	—	
Delhi ..	—	—	—	—	—	—	—	—	—	
TOTAL	320	480	800	310	490	800	290	530	820	

APPENDIX VII I

Scale of Inspection proposed and Additional Supervisory Staff Needed

State	No. of expts. proposed for harvest stage : inspection				Staff required		Existing strength of NSS Supervi- sory staff	Addl. staff required
	Cotton	Other crops		Cotton	Other crops			
		Yearly	Rota- tional average per year					
1	2	3	4	5	6	7	8	
Andhra Pradesh	20	310	86	4	18	9	13	
Assam	—	130	20	—	6	4	2	
Bihar	—	390	60	—	19	9	10	
Gujarat	80	210	70	16	18	6	28	
Jammu & Kashmir	—	60	—	—	3	2	1	
Kerala	—	20	—	—	1	1	—	
Madhya Pradesh	40	344	74	8	17	7	18	
Madras	20	174	40	4	10	5	9	
Maharashtra	120	390	74	24	20	9	35	
Mysore	50	300	70	10	20	7	23	
Orissa	—	120	36	—	7	4	3	
Punjab	30	308	40	6	15	11	10	
Rajasthan	20	270	60	4	13	9	8	
Uttar Pradesh	20	490	150	4	27	13	18	
West Bengal	—	300	26	—	14	—	14	
Himachal Pradesh	—	80	—	—	3	—	3	
Delhi	—	30	—	—	1	—	1	
TOTAL	400	3,926	806	80	212	96	196	

APPENDIX IX

Scale of Inspection proposed for the State Departmental/Statistical Staff in respect of the Additional Experiments and Additional Supervisory Staff required

State	No. of addl. expts. proposed			Addl. Supervisory staff required	
	for survey	for inspection by		Departmental	Statistical
		Departmental staff	Statistical staff		
1	2	3	4	5	6
Andhra Pradesh ..	1,800	270	140	30	3
Assam	750	*	110	*	4
Bihar	2,400	300	180	40	5
Gujarat	1,500	230	110	25	6
Jammu & Kashmir	—	—	—	—	—
Kerala	—	—	—	—	—
Madhya Pradesh ..	1,400	210	110	23	2
Madras	1,750	260	130	29	3
Maharashtra	2,700	400	200	45	6
Mysore	1,850	280	140	31	4
Orissa	1,750	*	260	*	8
Punjab	900	140	70	15	2
Rajasthan	1,550	230	120	26	3
Uttar Pradesh	5,100	770	380	85	11
West Bengal	—	—	—	—	—
Himachal Pradesh ..	—	—	—	—	—
Delhi	—	—	—	—	—
TOTAL ..	23,450	3,150	1,950	349	57

*Statistical Staff are synonymous with departmental staff.

APPENDIX X

Sample Survey for Estimation of Area Brought Under Improved Agricultural Practices—States Covered During Different Seasons

1961-62		1962-63		1963-64*
Kharif	Rabi	Kharif	Rabi	Kharif
(1)	(2)	(3)	(4)	(5)
1. Andhra Pradesh	1. Andhra Pradesh	1. Andhra Pradesh	1. Andhra Pradesh	1. Kerala
2. Assam	2. Bihar	2. Assam	2. Mysore	2. Mysore
3. Bihar	3. Madhya Pradesh	3. Madhya Pradesh	3. Rajasthan	3. Madras
4. Madhya Pradesh	4. Rajasthan	4. Punjab	4. Punjab	4. Punjab
5. Mysore	5. Uttar Pradesh	5. Rajasthan	5. Uttar Pradesh	5. Rajasthan
6. Punjab	6. Gujarat	6. Uttar Pradesh	6. Maharashtra	6. Uttar Pradesh
7. Rajasthan	7. Himachal Pradesh	7. Maharashtra		
8. Himachal Pradesh		8. Kerala		
		9. Jammu & Kashmir		

*States from which proposals for undertaking survey during Kharif 1963-64 have been received.

		PRICE			
		Rs.	p.	S.	d.
AGRICULTURAL LEGISLATION IN SERIES					
31.	Agricultural Legislation in India, Vol. I Regulation of Money Lending (R. Edition)	5	00	8	0
32.	Agricultural Legislation in India, Vol. II Consolidation of Holdings (R. Edition)	3	25	5	3
33.	Agricultural Legislation in India, Vol. III, Agricultural Production and Development	12	25	19	0
34.	Agricultural Legislation in India, Vol. IV. Land Reforms (Abolition of Intermediaries)	12	00	19	0
35.	Agricultural Legislation in India, Vol. V. Village Panchayats	14	62	23	0
36.	Agricultural Legislation in India, Vol. VI. Land Reforms (Reforms in Tenancy)	15	00	23	6
37.	Agricultural Legislation in India, Vol. VII. Livestock & Fisheries	5	00	8	0
38.	Agricultural Legislation in India, Vol. VIII. Relief to Agricultural Indebtedness	12	60	19	0
39.	Agricultural Legislation in India, Vol. IX--Agricultural Taxes	15	00	35	0
GUIDES					
40.	Guide to Cotton Statistics	1	50	2	3
41.	Guide to Current Agricultural Statistics (R. Edition)	4	25	9	11
42.	Guide to Jute Statistics	0	31	0	6
43.	Guide to Oilseeds Statistics	1	12	1	9
44.	Guide to Sugar Statistics	0	75	1	0
FARM MANAGERMENTS					
45.	Studies in the Economic of Farm Management Reports :—				
	(a) West Bengal 1954-55 to 1956-57	16	00		
	(b) Uttar Pradesh 1954-55 to 1956-57	16	00		
	(c) Madras 1956-57	16	00		
	(d) Punjab 1954-55 to 1956-57	16	00		
	(e) Bombay 1954-55 to 1956-57	16	00		
	(f) Madhya Pradesh 1955-56 to 1956-57	16	00		
	(g) Sambalpur (Orissa) 1957-58	18	50		
46.	Papers on Farm Planning & Management	12	00	19	0
47.	Report on Farm Planning & Management (E. F. Daniel Report)	11	00	17	0
MISCELLANEOUS					
48.	Agricultural Economics in India—A bibliography (Second Edition)	8	75	14	0
49.	Indian Agricultural Atlas, 1958 (Ordinary Edition)	12	00	19	0
50.	Indian Agricultural Atlas, 1958 (De-Luxe Edition)	15	00	23	6
51.	Indian Cotton Pressing Factories & Returns, 1957-58	11	00	17	0
52.	Indian Crop Calendar (English Version)	3	75	6	0
53.	Indian Crop Calendar (Hindi Version)	3	75	6	0
54.	Studies in Agricultural Economics, Vol. III	7	50	11	6
55.	Report on Market Arrivals of Foodgrains, 1958-59 Season	5	25	8	3
56.	Rice Economy of India	10	50	16	6
57.	Economic Survey of Indian Agriculture, 1960-61	9	00	21	0

* Price not yet Fixed.

Copies of the above publications are available from :—

The Manager of Publications, Civil Lines, Delhi-6.

